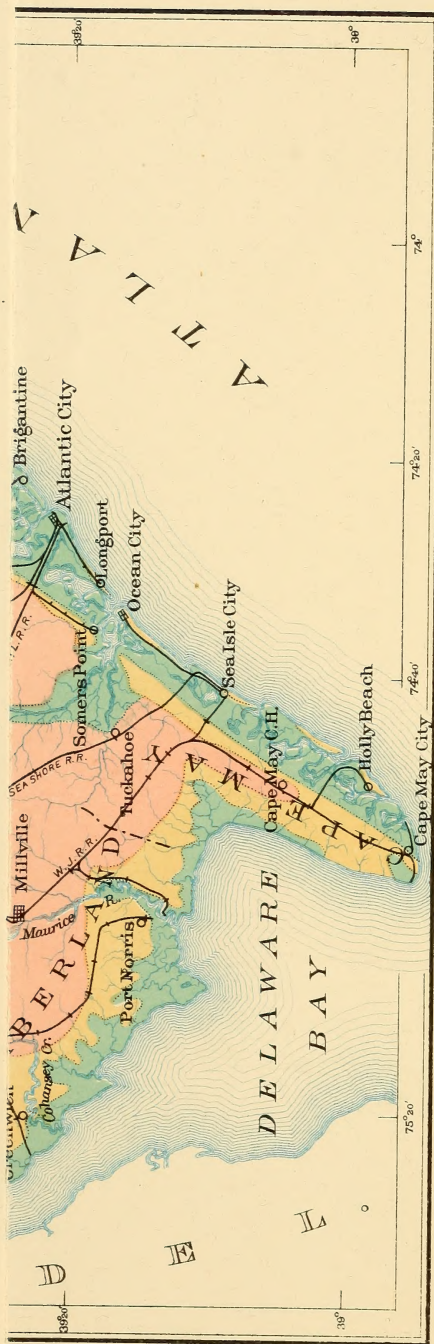
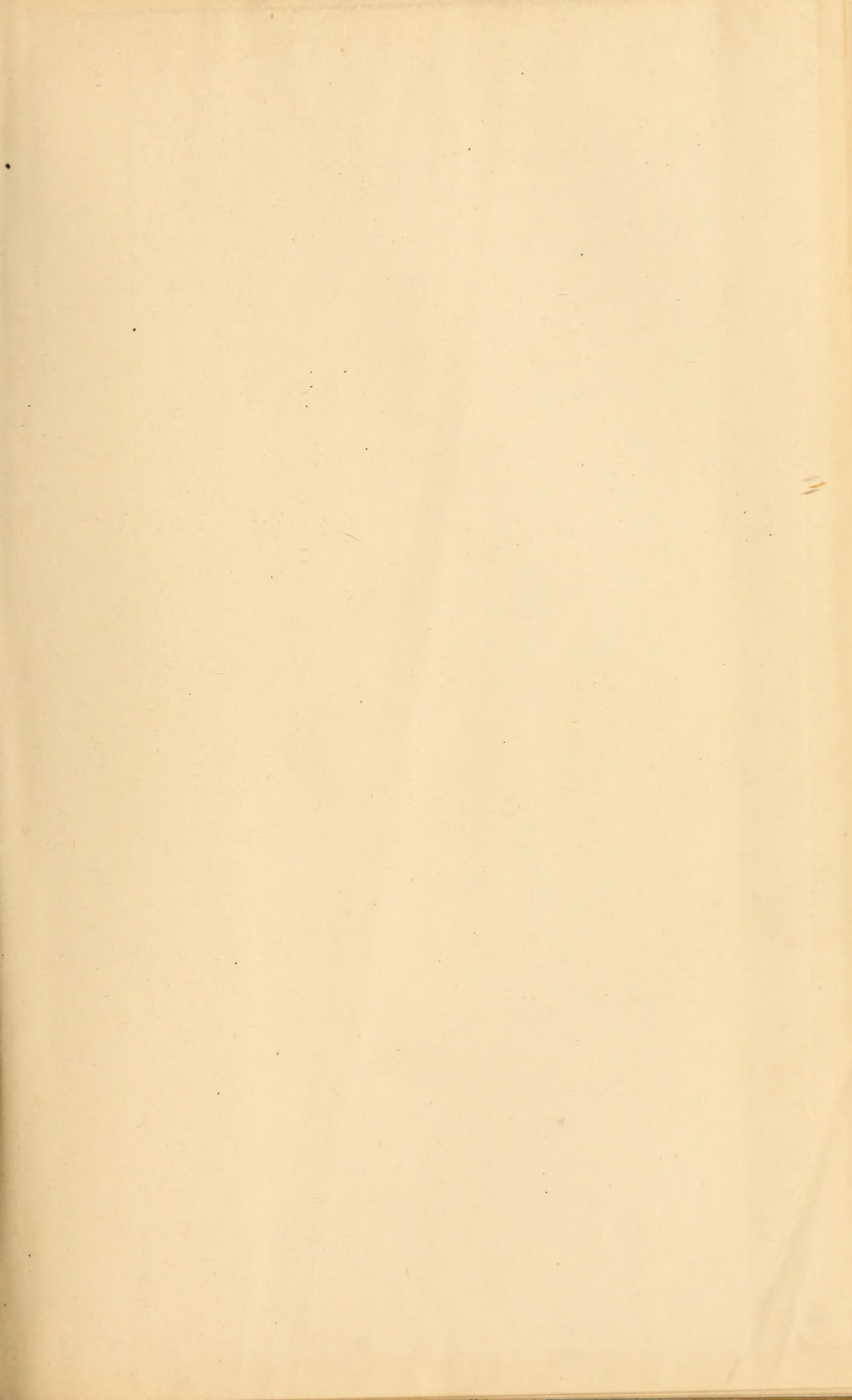


REPORT
OF THE
NEW JERSEY STATE
MUSEUM
1909




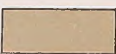



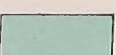


A MAP OF
NEW JERSEY
1910.

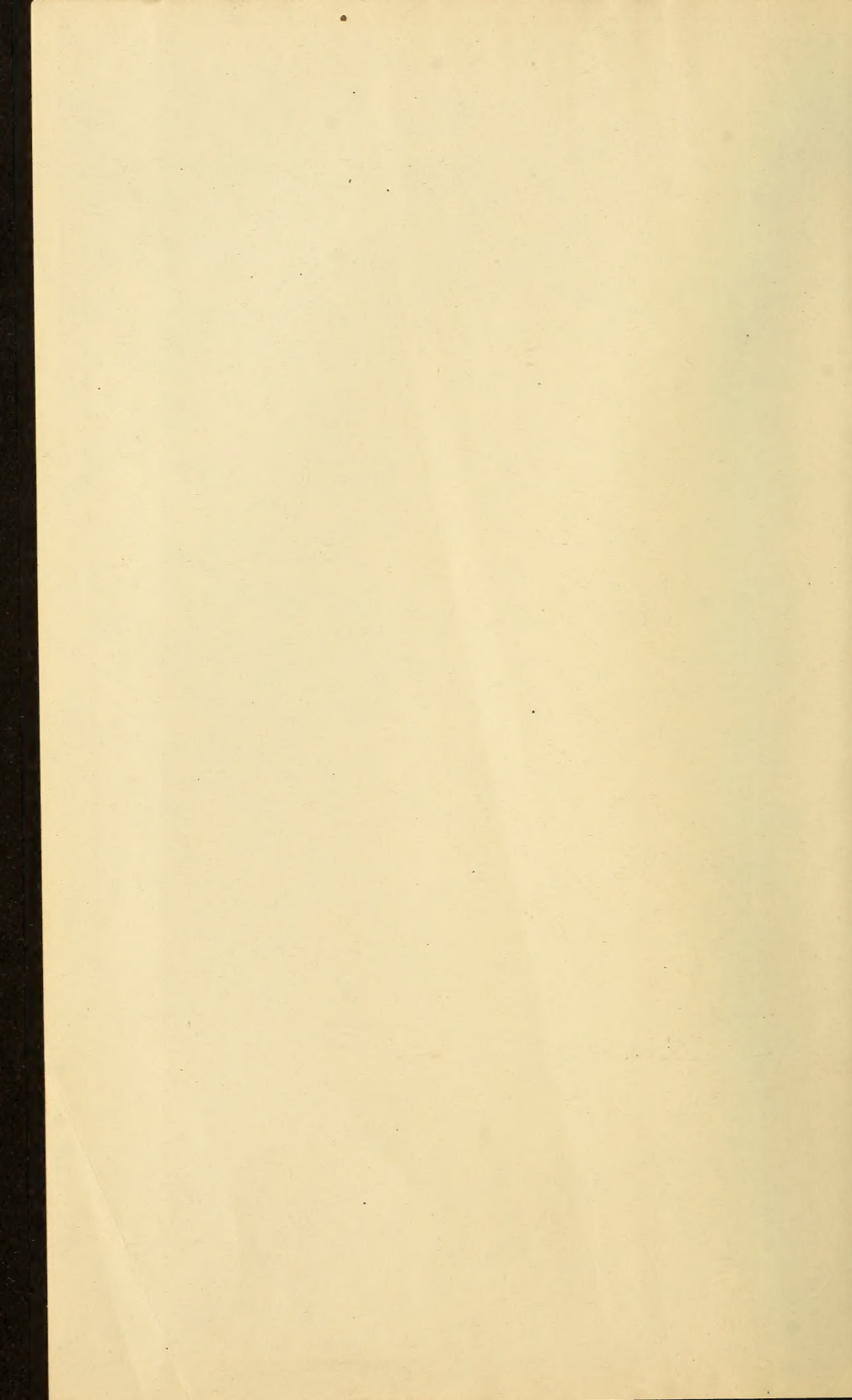
Scale of Miles
0 5 10 15

(Base Map by the Geological
Survey of New Jersey)

LEGEND

-  APPALACHIAN
-  HIGHLANDS
-  PIEDMONT PLAIN
-  DELAWARE VALLEY
-  PINE BARRENS
-  COASTAL STRIP







AUSTIN C. APGAR, *former Head of Biological Department.*

PROF. JOHN B. SMITH, *State Entomologist.*

WILLIAM H. WERNER, *State Taxidermist.*

THREE HEAD OF DEPARTMENTS OF THE MUSEUM.

ANNUAL REPORT

OF THE

NEW JERSEY STATE MUSEUM

Including a Report of the Insects
of New Jersey

1909

TRENTON, N. J.
MACCRELLISH & QUIGLEY, STATE PRINTERS.

1910

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ANNUAL REPORT

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NEW JERSEY STATE
MUSEUM

Including a Report on the Insects
of New Jersey

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Printed by the
State of New Jersey
1909

Commissioners of the New Jersey State Museum.

STATE SUPT. OF PUBLIC INSTRUCTION, CHARLES J. BAXTER, *President.*

STATE GEOLOGIST, HENRY B. KÜMMEL, *Secretary.*

PRESIDENT STATE BOARD OF AGRICULTURE, E. B. VOORHEES.

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Educational.

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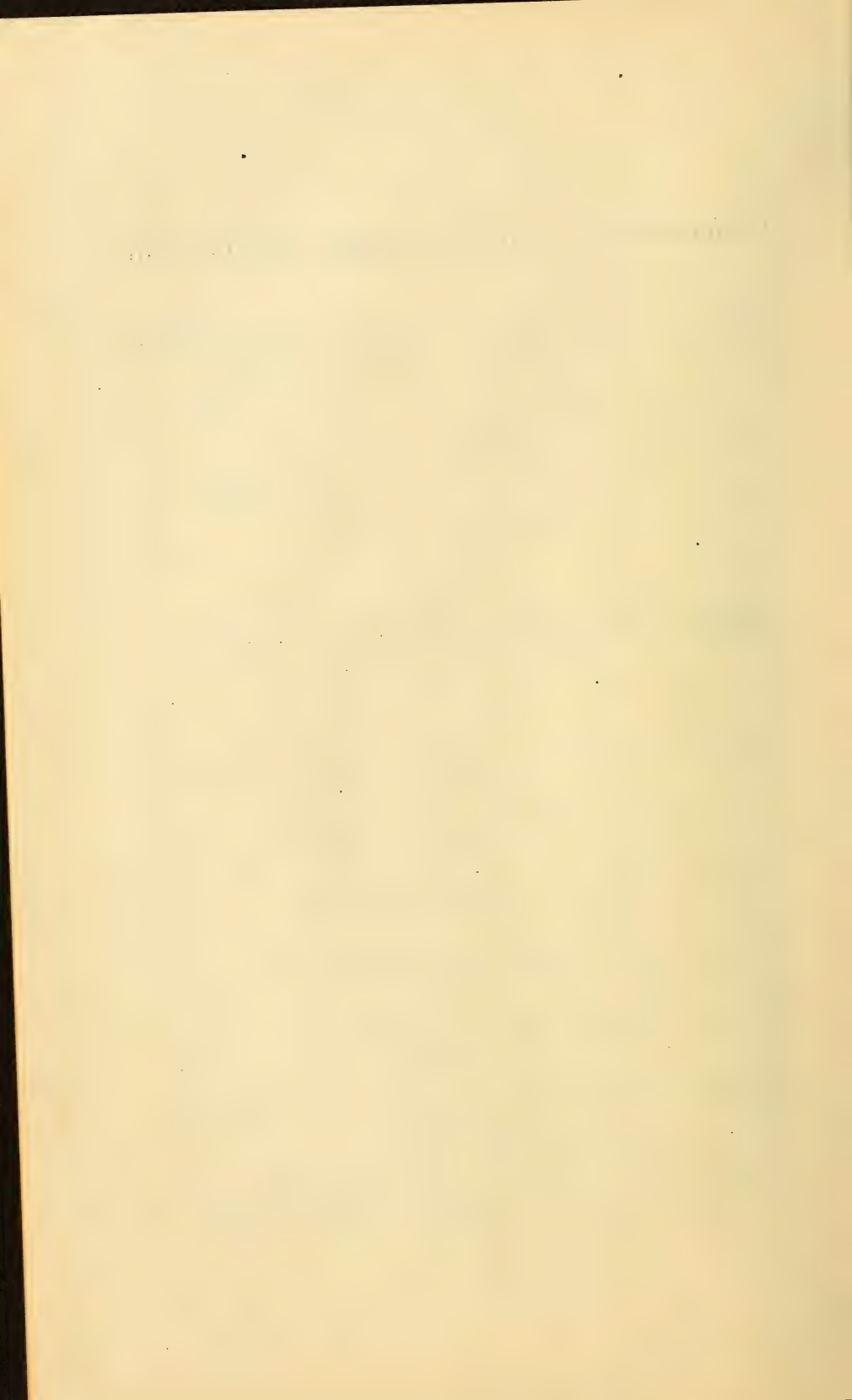
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HERBERT M. LLOYD, SECRETARY OF GEOLOGICAL SURVEY,
Archæology.



Letter of Transmittal.

TRENTON, N. J., November 30th, 1909.

*To the Honorable John Franklin Fort, Governor of the State of
New Jersey:*

SIR—I have the honor to present, for the Commissioners of the New Jersey State Museum, the annual report, including a Report of the Insects Found in New Jersey.

SILAS R. MORSE,
Curator.



Curator's Report.

In the present report for 1909, we are endeavoring to present a subject that will be on the line of education, as in the previous reports. It is a subject that every person in New Jersey should be interested in and study. It follows the Report on Birds, as they are the destroyers of the insects.

Unless the people of New Jersey study insects and how to destroy them, it will cost the State many thousand dollars to prevent the destruction of the crops, trees, etc.

Massachusetts has spent, it is said, over a million dollars in trying to destroy two imported insects, the Gypsy Moth and the Brown-Tail Moth, which are sure to invade New Jersey as they have every New England State.

In selecting Prof. John B. Smith, of the New Jersey Experimental Station, at Rutgers College, we know no better man in the United States could have been procured. He has a reputation as one of the best entomologists, not only in this country, but in Europe. His success is known to every one. We feel sure that no former report of the State Museum has done more good than this one will do.

THE NEEDS OF THE MUSEUM.

The one thing we need most is more room. It is impossible to display many of our specimens, and those that are on exhibition are so crowded that they are not shown to advantage, while others cannot be displayed. Our exhibits of school work cannot be seen to any advantage on account of a proper place to install them. There should be rooms especially for this department of the Museum, where it could be made one of the most interesting and educational parts of the whole Museum. There is, in this department, work that was exhibited at seven great

8 REPORT OF NEW JERSEY STATE MUSEUM.

expositions, and it shows the growth and advancement of the educational system of New Jersey for the last thirty years.

The specimens now owned by the Museum need double the space we now have, and we are continually adding to the number.

The historical department can be made one of the best if room could be had for it. Valuable specimens of this kind are being lost for the want of room to place them. There are many valuable specimens in the State that we could procure at no cost if we could have a place to display them. They are continually being collected by other States, and thus can never be procured for the Museum.

ADDITION TO THE MUSEUM'S SPECIMENS BY PURCHASE.

BIRDS.

- | | |
|------------------------------------|-----------------------------------|
| Whistling Swan, M. | 2 Black Guillemot, M. & F. |
| Great Grey Owl, F. | Dovekie, F. |
| Great Horned Owl, M. | 2 Pomarine Jaeger, M. & F. |
| Horned Grebe, M. | 2 Royal Tern, M. & F. |
| Mallard Duck, M. | 2 Least Tern, M. & F. |
| Ring Neck Duck, F. | 2 Greater Shearwater, M. & F. |
| Harlequin Duck, F. | 2 Sooty Shearwater, M. & F. |
| 2 Northern Phalarope, M. & F. | 2 Wilson's Pintail, M. & F. |
| 2 Red Phalarope, M. & F. | 2 Cormorant, M. & F. |
| Wilson's Phalarope, F. | Gadwall, F. |
| 2 American Avocet, M. & F. | Redhead, F. |
| 2 Long-billed Dowitcher, M. & F. | Ring Neck Duck, M. |
| 2 Stilt Sandpiper, M. & F. | 2 Lesser Snow Goose, M. & F. |
| 2 White Rumped Shrike, M. & F. | 2 Greater Snow Goose, M. & F. |
| 2 American Oyster Catcher, M. & F. | 2 Marbled Godwit, M. & F. |
| 2 Pine Siskin, M. & F. | 2 Western Sandpiper, M. & F. |
| 2 Lark Sparrow, M. & F. | Wilson's Plover, F. |
| 2 Lincoln Sparrow, M. & F. | 2 Red Bellied Woodpecker, M. & F. |
| Prairie Hen, M. | 2 Fork Tailed Flycatcher, M. & F. |
| Yellow-Headed Blackbird, F. | 2 Arizona Kingbird, M. & F. |
| Ruby-Crowned Kinglet, F. | 2 Olive Sided Flycatcher, M. & F. |
| Spotted Sandpiper, F. | 2 Canada Jay, M. & F. |
| American Pipit, F. | Cowbird, F. |
| 2 Brown-headed Nuthatch, M. & F. | Lapland Longspur, F. |
| 2 Canadian Chickadee, M. & F. | Savanna Sparrow, F. |
| Gray Cheek Thrush, M. | Henslow's Sparrow, F. |
| 2 Bicknell's Thrush, M. & F. | 2 Ard. S. T. Sparrow, M. & F. |
| 2 Wilson's Thrush, M. & F. | 2 Swamp Sparrow, M. & F. |
| | Indigo Bunting, F. |
| | Summer Tanager, F. |

- Prothonotary Warbler, F.
 2 Golden Warbler, M. & F.
 2 Nashville Warbler, M. & F.
 Cape May Warbler, M.
 Yellow Warbler, F.
 Magnolia Warbler, F.
 2 Bay Breasted Warbler, M. & F.
 2 Yellow Palm Warbler, M. & F.
 2 Prairie Warbler, M. & F.
 2 Kentucky Warbler, M. & F.
 Wilson's Warbler, F.
 Canadian Warbler, F.
 Louisiana Water Thrush, F.
 Conn. Warbler, F.
 Morning Warbler, F.
 2 Bewicks Warbler, M. & F.
 2 House Wren, M. & F.
 2 American Scoter, M. & F.
 2 Long-billed Curlew, M. & F.
 Hairy Woodpecker, M.
 2 Wood Pewee, M. & F.
 2 Yellow Billed Flycatcher, M. & F.
 2 Orchard Oriole, M. & F.
 2 Boat Tailed Grackle, M. & F.
 Blue Grosbeak, F.

FISH.

- Brown Trout.
 4 Brook Trout.
 Porcupine Fish.
 Fool Fish.
 Trunk Fish.
 Angel Fish.
 Moon Fish.
 Saw Fish.
 Sea Bat.
 Horse Foot Crab, large and small.
 Hermit Crab.
 Fiddler Crab.
 Swimming Crab.
 Brook Trout.
 Purple Spined Urchin.
 Key Hole.
 Sea Horse.
 Devil Fish.

MAMMALS.

- Mounted Fisher.
 Group of 6 mounted Beaver.
 3 Moles.
 3 Mice.
 Mounted group of 3 Deer.
 Mounted Raccoon.

BIRDS' EGGS.

- 2 Holboell's Grebe eggs.
 1 Parastic Jaeger egg.
 3 Ring-bill Gull eggs.
 3 Gull-billed Terms eggs.
 2 Caspian Terms eggs.
 1 Sooty Terms egg.
 1 Fulamr egg.
 1 Cormorant egg.
 1 American Merganser egg.
 1 Baldpate egg.
 13 Blue-winged Teal eggs.
 1 Canvas Back egg.
 1 Old Squaw egg.
 2 Harlequin eggs.
 4 American Bittern eggs.
 3 American Egret eggs.
 3 Yellow-crowned Night Heron eggs.
 4 Purple Gallinule eggs.
 3 Bartramian Sandpiper eggs.
 1 Canada Grouse egg.
 1 English Pheasant egg.
 2 Mourning Dove eggs.
 5 Cooper's Hawk eggs.
 3 American Osprey eggs.
 8 Burrowing Owl eggs.
 1 Hairy Woodpecker egg.
 4 Arkansas Kingbird eggs.
 3 Prairie Horned Lark eggs.
 2 American Magpie eggs.
 4 Blue Jay eggs.
 1 Northern Raven egg.
 1 Rusty Grackle egg.
 4 Savanna Sparrow eggs.
 2 Blue Grosbeak eggs.
 4 Barn Swallow eggs.
 3 Red-eyed Vireo eggs.
 1 Blue-winged Warbler egg.
 5 La. Water Thrush eggs.

10 REPORT OF NEW JERSEY STATE MUSEUM.

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- Penn. Museum and School of Industrial Art, No. 10, April, 1905.
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- Penn. Museum and School of Industrial Art, No. 16, October, 1906.
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Penn. Museum and School of Industrial Art, No. 21, January, 1908.
Penn. Museum and School of Industrial Art, No. 22, April, 1908.
Penn. Museum and School of Industrial Art, No. 23, July, 1908.
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Penn. Museum and School of Industrial Art, No. 27, July, 1909.
Penn. Museum and School of Industrial Art, No. 28, October, 1909.
Penn. Museum and School of Industrial Art, Tulip Ware of the Pa. Ger.
Potters.
Penn. Museum and School of Industrial Art, Majolica of Mexico.
Penn. Museum and School of Industrial Art, Lead Glazed Pottery.
Penn. Museum and School of Industrial Art, Artificial Soft Paste Porcelain.
Penn. Museum and School of Industrial Art, Tin Enameled Pottery.
Penn. Museum and School of Industrial Art, Salt Glazed Stoneware.

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Part I—Insects, their Classification and Distribution.

CHAPTER I.

INTRODUCTORY.

Twenty years ago, Dr. Geo. H. Cook, then State Geologist as well as Director of the Agricultural Experiment Stations, asked me to prepare, as part of the final report of the survey which was published in 1890, a list of the insects known to occur in New Jersey. The time was brief, the sources of information were few and our knowledge of the classification of some of the orders was limited. That, under the circumstances, the list should be incomplete and imperfect was to be expected, and no one recognized that better than I. Nevertheless, in spite of its defects, the list served a useful purpose and stimulated interest beyond all expectation. It also produced so much additional information that, in 1899, ten years later, the State Board of Agriculture authorized me to prepare another edition, or in reality a new work, which was published in 1900 as a supplement to the Twenty-seventh Annual Report.

In this second edition a number of departures were made. More time being allotted and more material being at hand, the aid of specialists in the various orders was enlisted and a much more complete picture of the insect fauna was obtained. Illustrations were introduced and an attempt was made to picture at least representative species of the main groups. And, while it was impossible to give much information about so many species, a great many brief notes on food habits and on the methods of dealing with economic species were incorporated.

The publication was the most ambitious faunal list ever attempted in the United States, and it proved unexpectedly ac-

ceptable and useful. Requests were received from all parts of the country, from educational institutions and students, and long since the entire edition was exhausted. There is, perhaps, no similar work in such general use, and copies that find their way to dealers in second-hand books find a ready sale at a good price.

The book has stimulated study and has created increased demand for information concerning insect habits from all parts of the State. There is no other one work in New Jersey libraries from which an equal amount of such information can be obtained, and as a reference work it is in constant demand.

Since the publication of the last edition a new generation of collectors and students has come into being, and the entomological societies in New York City, Brooklyn, Philadelphia and in Newark have increased largely in membership. New Jersey still furnishes a favorite hunting-ground for many of these collectors and students, and our knowledge of the species has increased enormously. In the present edition there are 139 recorders, and many of those that had only a few records in the last edition have contributed liberally to this. Almost an equal number of contributors have died or have ceased to add to entomological work; but their notes are still serviceable and suggestive.

Among those who have contributed to the actual work of preparing the list there have been additions and subtractions. Mr. R. P. Dow has contributed a list of *Thysanura*, an order which was entirely unrepresented before. In the Neuropterous orders Mr. Nathan Banks is still authority, save in the *Odonata*, which, as before, have been done by Dr. Philip P. Calvert. The biting and sucking lice have been worked over by Prof. Herbert Osborn, and the list is from his publications as marked for me by him. In the Homopterous section of the *Hemiptera*, Mr. E. P. Van Duzee has helped me out and has identified a large part of the species for collectors of New Jersey material, while Dr. W. E. Britton has very kindly done the *Aleyrodidae*. In the *Hemiptera Heteroptera* Mr. J. R. de la Torre Bueno has prepared the list except in the *Capsidae*, in which Mr. Otto Heidmann has again contributed. In the *Orthoptera* Mr. James G. A. Rehn has arranged the list and has named much of the material gath-

ered. In the *Coleoptera* and *Lepidoptera* the list has been written by me with such help as is specifically acknowledged, except that the Microlepidoptera are almost entirely the work of Mr. W. D. Kearfott. In the *Hymenoptera* Mr. Henry L. Viereck is responsible for the present general arrangement, the gall-flies and ants being written by Mr. Beutenmuller and Dr. Wm. M. Wheeler, respectively. The *Diptera* are again listed by Mr. C. W. Johnson except for the gall-midges, which were done by Mr. Beutenmuller, and the mosquitoes, which were written by Mr. John A. Grossbeck. To all these gentlemen especial thanks are due, for without their help the list would have lacked much of its present completeness and accuracy. I have not mentioned here, specifically, all who have assisted to greater or less extent, but individual help will be found acknowledged in connection with the particular specialty, and I do not consider this assistance less valuable or worthy of grateful recognition because of its smaller scope.

To the members of the Newark Entomological Society, of the Brooklyn Entomological Society, of the New York Entomological Society, of the Feldman Social and of the American Entomological Society I am indebted for hearty co-operation and encouragement in all phases of this work.

In this edition the intention has again been to connect it with the preceding, so that so far as possible every name in the latter should be identifiable here. In most orders this has been possible; but not in all. Sometimes names are omitted without explanation where they were recorded as only probable; in such cases the probability has for some reason become remote, and that should be considered the explanation.

Where species have been transferred from one genus to another, the generic name used in the previous list is given in parentheses after the specific name; but when several species in succession have been so transferred, the generic name may appear in parentheses only two or three times to call attention to the matter and to locate the transferred names.

In no case must the synonyms given here in parentheses or following an = sign be considered as a scientific synonymical

reference. It means only that the first name given is the correct name or the name now in use to represent the species previously recorded under the second name or the name inclosed in parentheses. These references are merely for the identification of the names used in the previous edition and carry no weight otherwise.

CHAPTER II.

The system used in this list is practically the same as that of the previous edition, and it may be well to briefly state the characters of the orders as used here.

I assume that the primitive insect from which all the types now existing have descended was a small, soft-bodied creature living in moist earth or mud along the banks of bodies of water. It had six true legs, and probably leg-like abdominal appendages, no wings, no compound eyes or no eyes at all, and no developed breathing system; taking in oxygen from the surrounding moisture through all parts of the skin surface. The head was not much differentiated from the rest of the body, and the mouth parts were generalized, with three or four pairs of fleshy processes from which the jointed and other appendages of the more specialized mouth structures developed. These were the *Proto-thysanura*, and creatures not so very different occur among the *Thysanura* of the present day. The latter, however, have in some cases well developed mouth parts, while many live in dry places and have a fairly complete tracheal system. There are no distinct metamorphoses and the insects are wingless throughout.

Our primitive Thysanurans divided early into two branches on mouth structure; some becoming mandibulate or fitted for chewing, while others became haustellate, fitted for puncturing plant or animal cells, and living on the juices alone. In both these branches wings developed, very different in type and yet with fundamentally the same scheme of venation.

The little order *Thysanoptera* has the mouth parts fitted for puncturing or scraping the surface so as to get at the plant juices, which are then drawn into the body. The wings are long, very narrow, frail, not connected, and altogether the structure is primitive. Popularly they are known as *Thrips*, and some of them are decidedly injurious to farm crops.

A decided step forward is made in the *Rhyngota*, in which the mouth parts are developed into slender lancets fitted for piercing, and are protected by a jointed beak except in the parasitica and

scale insects. These creatures are able to puncture tissue and to suck the juices of animals or plants as the case may be.

The *Parasitica* contains those forms without wings, adapted to live among the hair, on the blood of certain vertebrates, and here the lancets are retractile into the head, the beak being lost or modified into a short snout with or without anchor hooks or processes.

The order *Homoptera*, or *Hemiptera-Homoptera*, contains the plant lice, scale insects, leaf-hoppers, mealy bugs, etc., hence is, in its entirety, injurious to the agriculturist. The head is here closely applied to the thorax, the beak is directed backward and issues underneath the head so far that, in many cases, it seems to come out between the front legs. In the scale insects the beak is lost in the female, and in the males the mouth structures are partially or altogether lost. When wings are present they are uniform in texture throughout, but there is often a difference in the texture of the two pairs.

The order *Heteroptera* or *Hemiptera-Heteroptera* marks the extreme of the development in the *Rhyngota*, and here the mouth structures are more free, the beak often from the front of the head so that it may be directed straight forward, the forewings thickened and leathery or chitinous at base, thin and membranous at tip, usually divided into well-marked regions. None of the *Rhyngota* have a completed metamorphosis and altogether this branch, with sucking mouth parts in all stages, remained a limited and inferior one.

The branch in which mandibles were developed found a much greater range of food-getting possibilities and split up into a much greater number of divisions.

With the development of wings, the thoracic segments which bear the organs of locomotion became modified. At first the three segments were similar to each other, and one series retained this peculiarity, all the rings being of practically equal importance. All these are loose-jointed frail forms with large, transparent wings. A departure was made when the second and third segments, which bear the wings, became united for more compact muscular attachments, and the first segment or prothorax

was left free. The highest specialization was reached when all three of the thoracic segments united to form a compact body supporting all the organs of locomotion. These modifications, once started, tended to become intensified, and there is little difficulty now in recognizing the orders belonging to each series.

Perhaps the simplest type in general structure are the *Isoptera*, including what are generally known as Termites or white ants. They are soft-bodied, loose-jointed, all the thoracic rings well developed and altogether primitive in appearance. The wings are large and frail, net-veined, not united in flight and not folded when at rest. Yet, while these insects retain their primitive structure, they have become very highly specialized socially, living in immense communities with specialized worker, soldier and other castes. The workers are blind, never become winged, and even the sexually-mature winged forms have no resting stage; the metamorphosis is incomplete.

The *Mallophaga* are the biting lice, and have the same general form as the Termite workers except that they are more flattened and are adapted to their parasitic mode of life. Wings are never developed, the metamorphosis is incomplete, and the insects most commonly infest birds.

The *Corrodentia* mark yet another step in advance, but are still soft-bodied and loose-jointed. The book-lice found in houses are a common type, and resemble the biting lice in form; but they are very active and run rapidly. Some forms develop wings, which are peculiarly veined and not folded when at rest.

The *Neuroptera*, including Aphis lions and Ant-lions, are yet further specialized. The larvæ retain the Termite worker type, but are more oval and the jaws are much larger and characteristically developed for a predatory mode of life. The larvæ, when full grown, form true pupæ, which remain quiescent until the adult emerges, and the metamorphosis is thus complete. The adults have, generally, long, slender bodies, with large wings, which are laid flat when at rest and not folded. This is by far is very compact, the constriction between head and thorax is very is very compact; the constriction between head and thorax is very well defined, and, altogether, the resemblance to some of the types of the third series is strongly marked.

It will be noted that all the orders of the first series are terrestrial in all stages, and that in none of them are the wings folded in any way.

The second series of the mandibulates is that in which the first segment of the thorax became separated from and movable upon the second, while the second and third became closely united. In all cases the head is set into the first thoracic segment, and there is never any distinct neck between. This series branched early into two main divisions, one of them adapted to living on land, the other living in or under water.

The *Plecoptera*, or plaited winged forms known as stone-flies, have the wings net-veined, and the hind wings are folded or plaited beneath the fore wings when they are at rest. The larvæ live under stones in water, breathing by means of gill-tufts; the pupæ are active and the metamorphosis is thus incomplete.

An advance is noted in the *Platyptera*, where the transformations become complete. In general appearance they are not unlike the stone-flies, but are more compactly built, with the wings folded in much the same way. They are known as fish-flies, and some of them are very large and formidable in appearance. The larvæ live on the bottom of streams under stones, breathing through gill-tufts and usually coming to the shore to pupate. The largest of these larvæ are known to fishermen as *Hellgramites*, and are often gathered in numbers as bait for bass.

In the terrestrial series the roaches first became developed, and from them the other members of the order *Orthoptera* or straight-winged insects, grasshoppers, katydids, crickets and the like. In all these the fore wings are actually or comparatively narrow, more or less thickened in texture, while the hind wings are folded fan-like beneath them. The pupal stage is active, and the transformation, therefore, incomplete. Some of the roaches had, and some yet have, the secondaries transversely folded, and from this type we derive the *Dermoptera* and *Coleoptera*.

The *Dermoptera*, or ear-wigs, resemble small, short-winged beetles, with a curious, forceps-like anal appendage, which they

use in tucking in the elaborately folded hind wings beneath the short wing-covers. The transformations are incomplete.

The *Coleoptera*, or sheath-winged insects, commonly called beetles, illustrate the extreme of this line of development. They have the fore wings hardened so as to be useless for purposes of flight, and they are laid on the back so as to meet in a straight line down the middle. The secondaries are folded transversely under the wing-covers or elytra, and the metamorphosis is complete.

The third and last of the mandibulate series is that in which all the thoracic rings are united together to form a more or less compact or even, barrel-shaped mass. The head is now free from the thorax and united to it only by a slender neck. A fly, a bee or a butterfly will serve as an illustration.

The ancestry of this series began in the aquatic forms passing the larval stages under water, and the *Ephemerida* or day-flies are the earliest types. The larvæ live in the mud of stream and other water bodies in immense numbers and, when full grown, change to frail, gossamer-winged flies which have the fore wings larger than the second pair and both pairs held upright like those of butterflies when at rest. Most of the species have slender anal filaments, the mouth parts are aborted and the life period is very short in the adult stage, though as larvæ they may live for years. The transformations are incomplete.

The *Odonata* or dragon flies are also aquatic in the larval stage and in their day were numerous and well developed. They have two pairs of flat, net-veined, similar wings, and they are predatory in habit. The larvæ live in the mud of ponds and among water plants, feeding upon any soft-bodied insects that come in their way, and the pupa is as active as the larva. The order has many structural peculiarities in all stages and has no descendants, the line now tending to become lost.

From the Ephemerid type two lines diverged in larval structure—one to a caterpillar-like larva living in mud and moist places generally, the other toward a similar larva living in water and building a tube or case for protection. The latter are known as *Trichoptera* or "caddice-flies," the larvæ either predatory or plant-feeding. The adults have the wings more or less

densely covered with hair, the hind pair is folded under the fore wings and the mouth parts are aborted. The transformations are complete, and some of the local caddices or cases are marvels of structure and mimicry.

Direct descendants of this order are the *Lepidoptera* or scale-winged insects, including butterflies and moths. In these the mouth parts of the adult are modified into a coiled tongue serving only to lap up liquid food, while the caterpillars or larvæ have the mandibles well developed and chew their food. The transformations are complete.

The mud or earth living larvæ developed at once into terrestrial types, of which the oldest and most generalized are the *Mecoptera* or scorpion flies. They derive their common name from the fact that the males of many of the species are furnished with a prominent anal forceps curved upward like the tail of a scorpion, although entirely harmless. The wings are long, rather narrow, net-veined and not folded. The mouth parts are prolonged into a beak-like structure in which the parts are much divided and synthetic in type. They are predatory in all stages and the transformations are complete.

The *Hymenoptera* contain the bees, wasps, ants, saw-flies and the like, and among them we find the highest type of social organization and the extreme of intellectual development among insects. The mouth parts are in many cases elongated to enable them to gather the nectar of flowers, and they have four transparent wings with comparatively few veins and cells except in the saw-flies, where the venation is more complicated. The transformation is complete and in many cases the larva is dependent for its food upon the supply gathered by its parent.

The *Diptera* or flies can always be recognized by having two wings only, the hind pair appearing as vestiges merely. The larvæ are mostly footless, grub-like or maggots, and, while there is no development of social or intellectual characters, the flies are in their transformations and physical structure at the head of the insect world. The mouth structures are variably developed and may be adapted for lapping as in the common house-fly, or for piercing and sucking as in the equally common mosquito. The

importance of certain of these flies to the human race has only come to be appreciated in very recent years.

An offshoot from the *Diptera*, which has become partially parasitic, we find in the fleas, for which the ordinal term *Siphonaptera* is used. They are wingless, laterally compressed, and live as adults on warm-blooded, hair or fur-coated animals.

In a graphic form the scheme of classification is shown on the accompanying diagram. (See p. 26.)

For convenience of cataloguing, the sequence of the orders is modified so that all the neuropterous forms are grouped together before the *Rhyngota*, irrespective of the series to which they belong in point of development.

CHAPTER III.

FAUNAL CHARACTERISTICS.

New Jersey is in the Carolinian area of the upper austral zone, and its relations as a whole are with the territory to the south and southwest, rather than with that to the north or northeast. Only in the mountainous northwestern section in Warren and Sussex Counties is there a distinct element of the Transition zone, which is manifested to a much smaller extent along the northern boundary in Passaic and Bergen Counties.

Yet, although the State belongs to one general faunal area, the fauna is by no means uniform and it offers several very distinct though not sharply limited regions. These are based largely upon geologic formations which cannot be discussed here; but their general boundaries and character should be briefly stated. And first I wish to credit Dr. Philip P. Calvert with suggesting the importance and outlining the characters of the regions to avoid unnecessary elaboration in recording widely distributed species, and with suggesting the designations for the various regions.

Beginning at the northwestern corner of the State we have the *Appalachian* region, bounded at the southeast by that series of elevated ridges extending northeast and southwest, beginning with the Pochunck Mountain on the north, and reaching the Delaware River at the Marble Mountain, just north of Easton, including as part of the ridge the Scott, Jenny Jump and Allamuchy Mountains. This region contains the greatest elevations in the State and resembles in character the adjacent regions of Pennsylvania and New York. It has not been at all thoroughly collected, Mr. Johnson's records at Dunnfield and in the Water Gap region forming the most important contributions, and evidencing the transition characters strongly. Thus far no truly boreal elements have been found, but there may be a trace in the unexplored sections of the mountains.

East and a little south of the Appalachian come the *Highlands*, fairly defined at their western border, but very irregular at the

junction with the Piedmont Plain. This contains the hilly country of most parts of Hunterdon and Morris, and of smaller areas in Passaic and Bergen Counties. It extends from Riegelsville on the Delaware north to the junction with the Appalachian above Phillipsburgh. From the Delaware it extends irregularly eastward to the vicinity of White House Station on the Central Railroad of New Jersey. From that point it extends northeast in a very irregular line to the northern boundary, taking in Morris Plains, Boonton and Butler near the edge of the line. It extends as a narrow border along the northern line of the State and sends two spurs to the south. One of these spurs includes the Palisades and Highlands along the western shore of the Hudson River, to Hoboken. The second extends southward to Paterson, is there broken by the Passaic Valley and then takes in the narrow ridge of the Orange or Watchung Mountains, the southern tip coming near to Somerville. This region is rolling or hilly in character, with deciduous forests, and contains much area under cultivation. The transition element is marked though not conspicuous in this region, and many of the New York species come into it. A large part of the Orange Mountain and Palisade districts have been thoroughly collected in some of the orders, but along the northern border little has been done except in the Greenwood Lake district, and in the more central portion only the Hopatcong territory has been explored. The Ramapo Mountains are almost unknown entomologically, and so indeed are most of the ridges in line with and parallel to the Green Pond Mountain.

The *Piedmont Plain* takes in the great red sandstone region, which is quite sharply bounded on the south by a line extending rather evenly southwest from the mouth of the Raritan River to Trenton. From Trenton it extends along the Delaware nearly to Riegelsville, and it fills in to the north everything to the edge of the Highlands, but does not quite extend to the shore line on the east. This area is largely under cultivation, has no great elevations, but has many large swamp areas and low meadow regions. The forests are deciduous and insect life is less abundant than to the north or south. There are a number of distinctive features in this region which are interesting: the elm-leaf beetle is strictly one-brooded, while in the Delaware

Valley region it is at least partially two brooded; the codling moth never has a full second brood, and only in exceptional seasons even a partial one. And so there are other points which are of economic interest and agricultural importance.

The *Delaware Valley* region extends south from Trenton along the Delaware River to the bay, and along the bay to Cape May, fringed south of Salem Creek by salt marshes. It extends eastward an average distance of about fifteen miles, until about opposite Bordentown it crosses the State in a strip about twenty miles wide to the Monmouth shore. Its northern border is formed by the Piedmont Plain; its southern and eastern border merges into the Pine Barrens. When it reaches the Monmouth shore this region sends a narrow strip northward along the coast-line, broadening along the shores of Newark Bay so as to take in the entire peninsula from Jersey City to Bergen Point and extending up the Hackensack Valley, including all the space between the Palisade spur of the Highlands on the east and the edge of the Piedmont Plain on the west. A southward extension of this region extends in a narrow strip along the ocean to Point Pleasant and then partially breaks up into a narrow interrupted fringe between the Pine Barrens and the salt marsh, and even appear on the large islands—*e. g.*, near Barnegat City, on seven-mile beach, five-mile beach, etc. Islands of this region occur also in the Pine Barrens, especially along the edges, and the boundaries here are difficult to establish.

This Delaware Valley region contains the best agricultural land in the State, and most of it is under cultivation. It is level or slightly rolling and has a rich diversified flora and insect fauna. Nearly the whole region has been thoroughly collected over and its peculiarities are well known.

The Pine Barrens occupy the area between the coastal strip on the east and the Delaware River region on the west, and altogether contain a greater area than any one other faunal region in the State. There are no natural boundaries to the north or west, and it simply merges into the Delaware Valley in an irregular manner, sending out spurs and islands of all sizes and forms. A singular detached island extends along the southern shore of

the Raritan River, and from South Amboy to Jamesburg, forming an excellent collecting ground.

The term "barrens" applied to this area is, in a way, a misnomer. There are many desolate stretches of pines and scrub oaks on a level sandy soil, but, on the other hand, there are hundreds of acres of excellent truck lands, and for small fruits there is no better section in the State. Pines and scrub oaks are, however, the dominant trees, and the country is level or but slightly rolling, the soil more or less sandy. There are acres of cedar, sphagnum and other swamps in this region, and many of these have been turned into profitable cranberry bogs. There is a great diversity of conditions in this area and, in consequence, the insect fauna is extremely rich. The species on the whole resemble those of more southern States, and Georgian or even the Floridian forms are not uncommonly met with, and yet the only trace of real boreal species has been found in the deep cold swamps of Ocean County. This area has been thoroughly explored by the Philadelphia collectors and certain parts of it by the New York collectors as well, so that its insects are tolerably well known.

The *Coastal strip* includes the marshlands lying between the bars fringing the coast and the mainland, and also those along the Delaware Bay and the rivers extending inland through the marshes. The insect fauna is scant, but some very characteristic species occur.

The strictly *maritime* region extends along the coast from Sandy Hook to Cape May, and is confined to the beach and the sand hills immediately back of it. It is not rich in species and the fauna is fairly well known.

The map which accompanies this report shows these regions as accurately as is at present possible.

CHAPTER IV.

BENEFITS AND INJURIES CAUSED BY INSECTS.

It is universally understood that insects cause greater or less injury each year to farm crops, and that injury has been conservatively estimated as averaging 20 per cent. of the total value. For the year 1908 this meant a loss to the United States at large of \$1,500,000,000, an almost incredible sum! In the State of New Jersey the 20 per cent. depreciation in value is fully maintained when all the crops are jointly considered, and it means an annual loss to the State running well into the millions. Much of this loss is avoidable and much of it is avoided by progressive agriculturists and horticulturists, leaving most of the burden where it justly belongs—the ignorant, careless or indifferent farmer.

But it is fair to present, on the other hand, the fact that without insects many kinds of crops could not be raised at all, and it is a serious question whether, if benefit and loss could be balanced, the benefit would not far outweigh the injury. It is as pollenizers that insects are chiefly beneficial, aside from bee-products, and many of our fruit and forage plants are largely or altogether dependent upon them for bountiful crops. Red-clover seed depends upon bumble-bees entirely; small fruits like strawberries, raspberries, &c., would be only a scant set without the flies and bees that visit the flowers, and many of our tree fruits are similarly served.

Cucurbs, including citrons, melons, squashes and the like, need bees of definite species for best results, and there are few cultivated plants on which some insects are not of some benefit.

Not only plant life is affected; indeed, almost all farm and other animals have insect parasites of some kind, internal or external, and here there is little to be said in favor of insects. To be sure, many of them are scavengers, removing animal and other decay, and thus they are indirectly beneficial, but the benefits so derived are in no proportion to the injury caused by the direct attack. Every dairyman knows that when cattle have to

fight flies or other pests they fall off in milk, and every farmer that ever sold a hide knows that bot holes lessen its value.

Even man does not escape attack, and has parasites as specifically dependent upon him as has any other animal. But it is not only the direct attack that is annoying, unpleasant or dangerous. Some of the most common of our pests act as carriers or intermediate hosts for serious diseases. It is bad enough to be bitten by a mosquito, but if that mosquito inoculates its victim with the germs of malaria, yellow fever or other pernicious trouble, the matter becomes much more serious. To be bitten by a flea is no great matter in itself, but if the flea came from a plague-infested rat, it is quite another matter.

It has been definitely demonstrated that a considerable number of febrile diseases depend for their transmission altogether upon certain kinds of insects, and that if these insects were eliminated, the diseases would disappear.

Ordinary house flies are about the most abundant of all our usual pests, and besides the annoyance they cause they are capable of carrying and often do carry the organisms that cause typhoid fever, and other enteric diseases, consumption, diphtheria and several other equally dangerous ailments. We must not, therefore consider these small creatures as insignificant or unworthy of study and attention. They are more dangerous and less easily controlled than the large predatory animals of the field and jungle. A campaign against flies and mosquitoes looks unworthy of a comparatively huge animal like man; but the combat is not so unequal and the victims of insect-borne diseases run into the thousands each month. Large areas of Africa have been depopulated by the sleeping sickness, borne by a Tsetse fly, and a similar fly makes the keeping of horses an impossibility in other portions of the same continent.

The fight against insects is not confined to the farmer and fruit grower, nor is he the only one that suffers from their depredations. The community at large is as much on the defensive; but it is only recently that this fact has been appreciated by our sanitary and medical authorities. As the agriculturist has learned to control those insects that oppress him and to lessen to the vanishing point their tax upon him, so it is quite possible to materially lessen if not to altogether eliminate the fly, mosquito and other pests that prey upon humanity at large.

Part II—Systematic List.

Order THYSANURA.

This order contains the "spring-tails" and "bristle-tails," which are small or minute, soft-bodied creatures without wings and no obvious transformations. The mouth parts are feebly developed, without obvious mandibles, and they are, as a rule, feeders upon the products of decay, though some of the larger forms are able to attack dry and hard substances by scraping the surface. They are among the most primitive of existing insects, a few of them closely resembling the early stages of "Myriapods," while in others the tracheal system is so feebly developed that respiration seems a function of the entire skin surface. Such insects can live in moist places only, and die as soon as they are exposed to drying out.

In this order Mr. R. P. Dow has kindly furnished the list, including such species as are so generally distributed that their occurrence in New Jersey is practically certain. There have been no actual collections.

Sub-order CINURA.

The long anal appendages which give these insects the name "bristle tails" are many-jointed and extend straight out. None of the species are jumpers.

LEPISMA Linn.

L. saccharina Linn. Occurs in households all over the world and generally in cellars or damp places. Is fond of moist sugar, and will feed also on starchy materials.

L. quadriseriata Pack. Similar in habit to the preceding, but a native insect, more common southwardly.

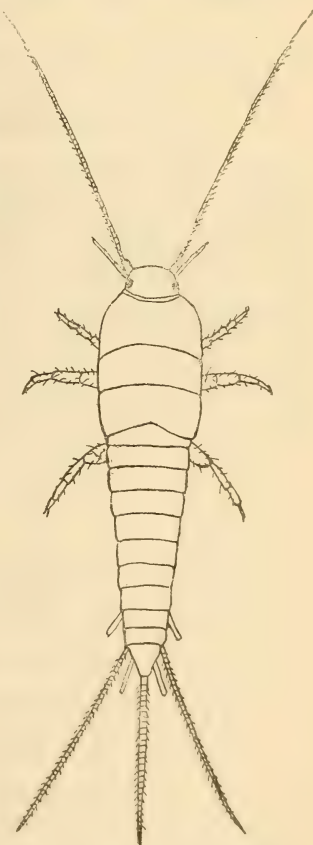


Fig. 1.—Silver-fish, *Lepisma* sp.; very much enlarged.

THERMOBIA Bergr.

T. domestica Pack. The common "silver-fish" or "fish moth" found everywhere in houses, and usually in dry places around kitchen stoves, in pantries, and even in dusty drawers. Feeds on starchy material, and sometimes gnaws the bindings of books. All these species are economically harmless.

SCOLOPENDRELLA Gerv.

S. gratiæ Ryder. In damp places, under leaves and mold; resembles a minute larval centipede.

CAMPODEA Westw.

C. americana Pack. Common everywhere in woods, under stones and leaves.

MACHILIS Latr.

M. variabilis Say. Generally distributed in the Atlantic States.

Sub-order COLLEMBOLA.

Much more abundant in species and specimens, and all small or very small. They are distinguished by a pair of short anal spines or "furcula," which are turned under the body and form a spring or leaping organ, which gives them the common name "spring-tails." Most of the species are feeders on vegetable decay, and they occur literally in thousands on manure beds, in toad-stools, on stored fermenting vegetables, in cellars and generally in damp places. A few species occur on living, healthy plants, but not in such a way as to prove injurious. The insects are very light, and after a heavy rain thousands may be seen hopping about on the surface of the pools formed in low meadows. I have seen millions on the water covering a cranberry bog reflowed late in May or early June.

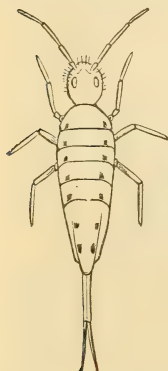


Fig. 2.—Podurid
with spring
tail extended.

SMYNTHURUS Latr.

S. arvalis Fitch. This and the four next following species are found on garden plants and are locally common.

S. elegans Fitch. With the preceding.

S. hortensis Fitch. Common on grasses.

S. quadrimaculatus Ryder. Locally common.

S. clavatus Banks. Under rotten bark, Sea Cliff, Long Island.

S. macgillivrayi Banks. Long Island, on weeds, in May.

PAPIRIUS Lubbock.

- P. marmoratus** Pack. Found on Long Island; probable in New Jersey.
P. novæ-boracensis Fitch. Under boards and rubbish.
P. unicolor Harv. On fungi, Maine to Ohio.
P. purpurascens MacGill. Long Island and probably New Jersey.

The number of species occurring in New Jersey will prove greater than this list shows. The material already in hand indicates this, but unfortunately it has not been worked up.

ORCHESELLA Templ.

- O. flavopicta** Pack. Long Island to Tennessee.

TOMOCERUS Nicolet.

- T. plumbeus** Linn. New Jersey is within the faunal region indicated by MacGillivray for this species.

SEIRA Lubbock.

- S. buskii** Lubb. A common European species which Professor Folsom regards as a recent importation to the eastern United States.

LEPIDOCYRTUS Bourlet.

- L. albus** Pack. Recorded from Maine to Tennessee.
L. marmoratus Pack. Massachusetts and probably New Jersey.
L. metallicus Pack. Maine to Tennessee.
L. pusillus Linn. Another European species; but there is room for doubt as to the correctness of the identification.

ENTOMOBRYA Rond.

- E. fasciata** Say. Recorded from Maine to Florida.
E. griseo-olivata Pack. Described from New York.
E. purpurascens Pack. Recorded from Maine to Tennessee.

ISOTOMA Bourlet.

- I. albella** Pack. Maine, New York and probably New Jersey.
I. fimetaria Linn. Throughout Europe and the United States.
I. glauca Pack. Recorded from "Massachusetts to Ohio."
I. nivalis Pack. New Jersey specimens taken are probably this species.
I. plumbea Pack. Long Island and probably New Jersey.
I. quadri-oculata Tullb. A green-house species, imported from Europe.

ACHORUTES Templ.

- A. boletivorus** Pack. Occurs from Maine to District of Columbia.
A. nivicola Fitch. The "snow-flea," found very early in the year on snow banks.
A. pratorum Pack. Described from "New York."



Fig. 3.—Podurid, commonly found on manure beds; spring not visible because curved beneath body.

PODURA Linn.

P. aquatica Linn. Europe and the United States generally; equally at home on land and water.

LIPURA Burm.

L. ambulans Linn. New York to District of Columbia.

L. fimetaria Linn. A common European species, which has been taken in Massachusetts and Ohio.

ANURIDA Laboul.

A. maritima Guer. Common throughout Europe and the Eastern United States.

ANOURA Gervais.

A. gibbosa Pack. Recorded from Maine to New York. New Jersey is probably within its range.

A. granari Nicol. Another European species which has been found as far west as Ohio, and probably occurs in New Jersey.

Order EPHEMERIDA.

The members of this order are popularly known as "May flies" because of the time of their greatest abundance, or "day flies" because of their short life in the adult stage. The ordinal term here used is based upon this same peculiarity in their life cycle. The adults have two pairs of wings, very closely net-veined, frail in texture, and the anterior much larger than the posterior. The head is large, set on a distinct neck, the mouth parts are aborted, the eyes prominent and the antennæ very short. The body is loosely jointed and the abdomen has long anal filaments, varying from three to five in number. The insects are attracted to light and on favorable evenings in early summer often come in swarms to the electric lights in cities or towns on lake or river banks. The early stages are passed in the water, the larvæ feeding in the mud and ooze, sometimes for a considerable number of years, before they attain maturity.

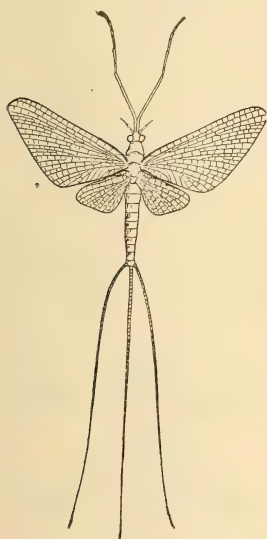


Fig. 4.—An adult May-fly.

There are many interesting and peculiar structures in this, perhaps the most ancient of the existing types of insects, and the enormous numbers of individuals that still occur, even though the number of species is limited, indicates the richness in organic life of the bottoms in which they feed. They are not of economic importance from any point of view.

POLYMITARCYS Eaton.

P. albus Say. New Brunswick in July.

HEXAGENIA Walsh.

H. bilineata Say. Caldwell (Cr); New Brunswick (Coll); Westville VI, Riverton VII, (Jn).

H. limbata Pict. Echo Lake, Passaic Co. VII, 2, Normannock VII (Ds).

EPHEMERA Linn.

E. decorâ Wlk. Caldwell, common (Cr).

LEPTOPHLEBIA Westw.

L. cupida Say. (*Blasturus*) Great Piece Meadows IV, 10-28, very common (Gr); Caldwell (Cr); Ft. Lee V, 1, Staten Island IV, 17, 27 (Ds); Jamesburg, Trenton IV, 30, Lahaway IV, 1 (Coll); Westville IV, 9 (Jn).

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- L. mollis* Eaton. Recorded from New Hampshire to North Carolina.
- L. nebulosus* Wlk. (*Blasturus*) Caldwell (Cr).
- L. præpedita* Eaton. Riverton V (Jn).

HADROPHLEBIA Eaton.

- H. americana* Banks. Passaic (Berry); the type locality.

EPHEMERELLA Walsh.

- E. excrucians* Walsh. Lake Hopatcong VII, 7, New Brunswick (Coll).

CÆNIS Steph.

- C. diminutiva* Wlk. Occurs from New York to Florida.
- C. hilaris* Say. Riverton VII (Jn).

BÆTIS Leach.

- B. propinquus* Walsh. Delaware Water Gap VII (Jn).
- B. unicolor* Hagen. New York to District Columbia.

CLEON Leach.

- C. vicina* Hagen. Caldwell, common (Cr).

CALLIBÆTIS Eaton.

- C. americanus* Banks. Staten Island (Ds).
- C. ferrugineous* Walsh. Ranges from Canada to the Southern States.
- C. undatus* Pict. (Cleon) New York to Cuba.

BÆTISCA Walsh.

- B. obesa* Say. Caldwell, not rare (Cr).

HEPTAGENIA Walsh.

- H. canadensis* Wlk. Del. Water Gap VII (Jn); Caldwell (Cr); New Brunswick (Coll).
- H. flaveola* Pict. (*Bætis*) New Brunswick VIII, 1 (Coll).
- H. fusca* Wlk. Caldwell, not rare (Cr).
- H. maculipennis* Walsh. New Brunswick V, 22, VII, 10 (Coll).
- H. interpunctata* Say. Riverton VII (Jn).
- H. pulchella* Walsh. Del. Water Gap VII (Jn).
- H. simplex* Walsh. New Brunswick VII, 24 (Coll).
- H. terminata* Walsh. Princeton VI, 11 (Coll).
- H. verticis* Say. Ranges from Canada to Georgia.
- H. vicaria* Say. Recorded from Canada to Georgia.

Order PLECOPTERA.

The "Stone flies" which constitute this order are loose-jointed, flattened, soft-bodied creatures with long net-veined wings, the hind pair longitudinally folded beneath the anterior. The head is large, the mouth parts are soft, antennæ long and tapering, eyes rather prominent. The prothorax is free and quadrate, the other segments loosely jointed. The abdomen is soft and usually with anal filaments or processes. These "flies" are found along the streams and rivers in which their larvæ occur, resting on the leaves and not easily disturbed; their flight is heavy and they do no feeding upon living plants so far as known. The larvæ live in streams under stones to which they cling so closely that, being very much flattened they are easily overlooked. They breathe by means of lateral gill tufts which occur also on the head, and which, in some species, persist even in the adult stage; a curious reminder of ancient conditions and an indication of the primitive character of this order! The pupæ are active and the transformation is incomplete. They form an important feature of the aquatic fauna in numbers of individuals as well as of species, but are of no economic importance.

Since the previous edition quite a number of genera and species have been taken, practically all of which have been determined by Mr. Banks.

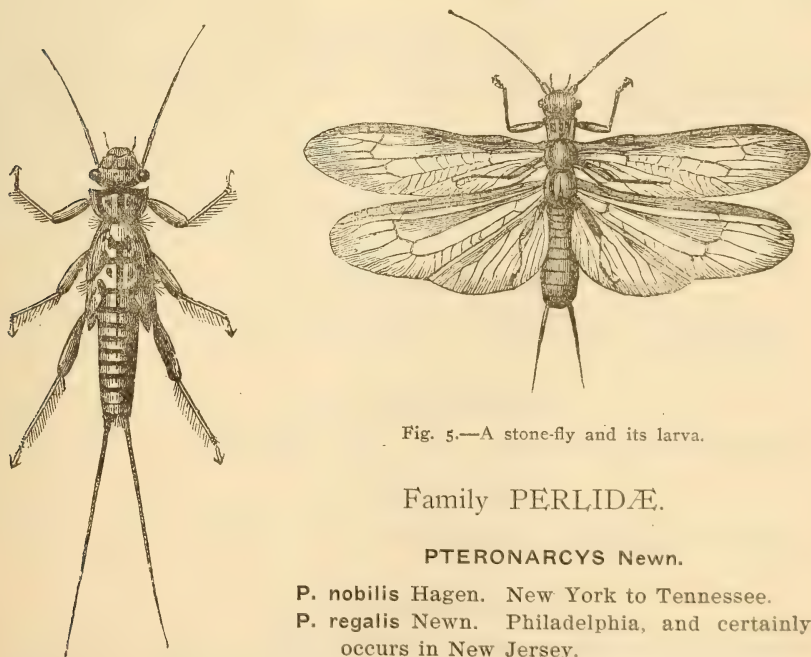


Fig. 5.—A stone-fly and its larva.

Family PERLIDÆ.

PTERONARCYS Newn.

- P. nobilis* Hagen. New York to Tennessee.
- P. regalis* Newn. Philadelphia, and certainly occurs in New Jersey.

ACRONEURIA Pict.

- A. abnormis** Newn. Newfoundland VI (Ds); Philadelphia.
A. arenosa Pict. (*arida* Hag.) Warren County VIII, 13, Orange Mts. (Coll).

ISOGENUS Newn.

- I. frontalis** Newn. Canada to New York and west to Ohio, so should occur in New Jersey.

PERLA Geoff.

- P. annulipes** Hagen. Eastern States to District of Columbia.
P. ephyre Newn. New York to Georgia.
P. placida Hagen. Riverton VII (Jn).
P. postica Wlk. New York to Georgia.
P. similis Hagen. Pennsylvania and Maryland.
P. tristis Hagen. Del. Water Gap VII, 3, 12 (div).
P. xanthenes Newn. Eastern States, generally.

PERLESTA Banks.

- P. virginica** Banks. (*Chloroperla*) Del. Water Gap VII, 12 (Coll).

NEOPERLA Need. (PSEUDOPERLA Banks).

- N. occipitalis** Pict. Del. Water Gap VII, 12, So. Jersey, New Brunswick IX, 19 (Coll).

ISOPERLA Banks.

- I. transmarina** Newn. Del. Water Gap (Slosson); Barnegat Bay dist. VII, 14 (Coll).

ALLOPERLA Banks.

- A. maculata** Pict. (*Chloroperla*) Philadelphia, and sure to occur in New Jersey.

CHLOROPERLA Newn.

- C. cydippe** Newn. (*Isopteryx*) New York to Chicago.

TÆNIOPTERYX Pict.

- T. maura** Pict. Common along the Passaic at Paterson III, 19; IV, 23 (Gr).

RHABDIOPTERYX Klap.

- R. fasciata** Burm. (*Tæniopteryx*) Caldwell (Cr); Staten Island IV (Ds); "New Jersey" 2 specimens in collection without definite locality.

NEMOURA Pict.

- N. albidipennis** Wlk. Canada to Virginia.
- N. similis** Hag. (*Tæniopteryx*) Caldwell (Cr).

LEUCTRA Pict.

- L. ferruginea** Wlk. Lahaway VI, 7 (Coll).
- L. tenuis** Pict. Taken at Philadelphia.

CAPNIA Pict.

- C. necydaloides** Pict. Staten Island III (Ds); in March on tree trunks or under bark (Bno).
- C. pygmæa** Burm. New York and Pennsylvania and surely to be found in New Jersey.



Order MALLOPHAGA.

This order contains the "biting lice," infesting warm-blooded animals generally, but so commonly found on birds that the term "bird-lice" has come to be generally used for them. They do not suck blood, the mouth parts being formed for biting only, but live among the hair and feathers of their hosts, subsisting upon what they can scrape from the surface. While they do not actually puncture the skin or feed on living tissue, they gnaw the soft material at the base of hair and feathers, eat the particles of dry scurf, the clotted blood at the edge of a scratch or other wound, and create a more or less constant irritation, which is likely to result in a loss of hair or plumage and a consequent mangy appearance. I have seen ill kept dairy cattle with patches bare of hair from this cause. In shape these parasites are flattened, elongate oval, with a large obtuse head, and often bulging eye prominences. The eggs are attached to hair or feathers, and the young resemble the adults in general appearance, there being no obvious transformations. Practically all birds, wild as well as domesticated, are infested, and in this list Prof. Herbert Osborn, of the Ohio State University, who has been good enough to aid me in its preparation, has indicated all the species whose host is known to occur in New Jersey; for where the host occurs the parasite is almost sure to be found when sought.

The list as it stands contains just one hundred species. It is probable that a few of these will never be found, either because the birds themselves are very occasional visitors, e. g., the Pelicans, or because the distribution of the parasite is really a very limited one. On the other hand, only a small proportion of our wild birds have been closely examined, and it is at least probable that a large percentage of those from which no parasites are yet reported will be found to be infested. So I believe that the list will be increased rather than lessened as the result of future work.

Remedial measures for domesticated birds are plenty of dust, with which they may thoroughly powder themselves, and the free use of white-wash and crude petroleum in chicken and other fowl-houses. Horses and cattle may be thoroughly brushed occasionally with a stiff brush dipped from time to time in crude petroleum. Kerosene must not be used, because it is likely to take out the hair. Where its application is convenient on small birds, carbolated vaseline can be employed to good advantage. On other animals carbolated soaps, miscible oils and other materials of that character may be used, and, in general, the amount of success is in proportion to the determination and persistence of the person making the application.

Family PHILOPTERIDÆ.

The antennæ are filiform, five-jointed, exposed; the tarsi have two claws, and all the species are parasitic on birds.

DOCOPHORUS Nitzsch.

- D. lari** Denny. Found on several species of gulls occurring along the Jersey shore and bays.
- D. melanocephalus** Burm. Occurs on gulls and terns of various species in North and South America and Europe.
- D. icterodes** Nitzsch. Common on ducks and geese, domesticated and wild.
- D. cygni** Denny. The little red swan louse; common throughout Europe and eastern North America.
- D. fusiformis** Denny. Occurs on the Sandpipers; "Tringa" sp.
- D. testudinarius** Denny. Taken on Bartrams Sandpiper; also known as "Upland," "Field" or "Grass" Plover.
- D. platystomus** Nitzsch. Infests hawks and eagles generally.
- D. buteonis** Pack. Found on the red-shouldered hawk and on one of the king-birds, "Tyrannus atra."
- D. halioti** Osb. Found on the bald eagle.
- D. cursor** Nitzsch. Occurs on owls of various kinds.
- D. bubonis** Osb. Infests the great horned owl.
- D. ceblebrachys** Nitzsch. Parasitic on the snowy owl.
- D. coccygi** Osb. Taken from the yellow-billed cuckoo.
- D. superciliosus** Nitzsch. Infests the hairy woodpecker.
- D. fusco-ventralis** Osb. Occurs on the wood pewee.
- D. corvi** Osb. Makes life miserable for the common crow.
- D. transpositus** Kellogg. Found on the cowbird.
- D. agelaii** Osb. Infests the red-winged blackbird.
- D. quiscali** Osb. A parasite of the crow blackbird.
- D. compar** Piaget. On the American or red cross-bill.
- D. communis** Nitzsch. A general parasite on larks, blackbirds and many other Passerines.

NIRMUS Nitzsch.

- N. lineolatus** Nitzsch. Taken on various gulls in Europe and America.
- N. furvus** Nitzsch. Occurs on "Phalaropus," and also recorded from Plovers.
- N. piceus** Nitzsch. On the American Avocet or "Blue-stocking."
- N. signatus** Piaget. A companion of the preceding on the same hosts.
- N. cordatus** Osb. Recorded from the Hudsonian Godwit or ring-tailed Marlin.
- N. orarius** Kellogg. A parasite of the Golden Plover.
- N. boophilus** Kellogg. Infests the "Killdeer."
- N. abruptus** Osb. Infests the common "Bob White."

- N. fuscus** Nitzsch. A common parasite of eagles, hawks and falcons.
N. discocephalus Nitzsch. Another parasite of the bald eagle.
N. fenestratus Nitzsch. Infests the black-billed cuckoo.
N. candidus Nitzsch. Parasitic on the hairy and red-bellied woodpecker and on the "Flicker"
N. tyrannus Osb. Infests kingbirds.
N. rotundatus Osb. Parasitic on the common crow.
N. secundarius Osb. With the preceding on the same host.
N. ornatissimus Giebel. On the red-winged blackbird.
N. illustris Kellogg. With the preceding on the same host.
N. picturatus Osborn. A parasite of the meadow lark.
N. cyclothorax Nitzsch. Infests the English sparrow.
N. pallidus Osb. From the rose-breasted grosbeak.
N. gracilis Nitzsch. A parasite of the Purple Martin.
N. brachythorax Giebel. Found on cedar-bird and other wax-wings.
N. orpheus Osb. A parasite of the catbird.
N. simplex Kellogg. Infests the robin.

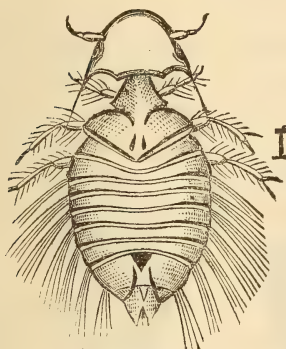


Fig. 6.—Turkey-louse, *Goniodes styliifer*.

LIPEURUS Nitzsch.

- L. longicornis** Piaget. Occurs on the double-crested Cormorant.
L. forficulatus Nitzsch. Found on Pelicans. Two species of Pelicans are listed as occurring in New Jersey, and specimens of one of the species are in the State Museum; but they are rare visitors, and it is stretching matters a little to record this as a New Jersey insect.
L. bifasciatus Piaget. The same remarks apply to this species.
L. squalidus Nitzsch. The common duck-louse; occurs on both wild and domesticated forms.
L. jejunos Nitzsch. Found on geese; wild and domesticated.
L. leucopygas Nitzsch. Occurs on Herons and Bitterns.
L. botauri Osb. On the American Bittern or marsh hen.
L. luridus Nitzsch. Infests the American Coot or mud hen.
L. picturatus Kellogg. Occurs with the preceding.
L. infuscatus Osb. Found on woodcock and upland plover.
L. dissimilis Piaget. Another parasite of the "Bob White."
L. polytrapezius Nitzsch. The turkey louse.
L. variabilis Nitzsch. Common on domestic fowls.
L. heterographus Nitzsch. Occurs with the preceding.
L. baculus Nitzsch. Found on domestic pigeons.

ORNITHOBIUS Denny.

- O. goniopleurus* Denny. Infests the Canada goose.
O. cygni Linn. The white swan louse.

ONCOPHORUS Rudow.

- O. minutus* Nitzsch. On the American Coot or mud hen.

GONIOCOTES Burm.

- G. compar* Nitzsch. Another pigeon parasite.

GONIODES Nitzsch.

- G. dispar* Nitzsch. A parasite of quail.
G. stylifer Nitzsch. Another turkey louse.
G. damicornis Nitzsch. Infests the common pigeon.
G. falcicornis Nitzsch. Common on pea-fowl.

Family **TRICHODECTIDÆ.**

Like the preceding family, but the antennæ are 3-jointed, the tarsi have only one claw, and all the species infest mammals.

TRICHODECTES Nitzsch.

- T. scalaris* Nitzsch. Common on domestic cattle.
T. parumpilosus Piaget. Biting louse of the horse.



Fig. 7.—Cow-louse, *Trichodectes scalaris*.

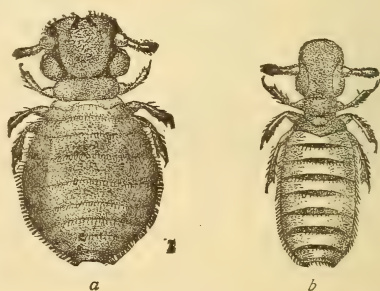


Fig. 8.—Dog-louse (*a*) and sheep-louse (*b*), *Trichodectes latus* and *sphærocephalus*.

- T. climax* Nitzsch. Infests the domestic goat.
T. sphærocephalus Nitzsch. Found on domestic sheep.
T. subrostratus Nitzsch. Infests the house cat.

- T. retusus* Nitzsch. Recorded from weasel.
T. mephitidis Osb. Occurs on the common skunk.

Family LIOTHEIDÆ.

The antennæ are 4-jointed, with an enlarged club at tip, concealed; tarsi with two claws, and all the species infesting birds.

PHYSOSTOMUM Nitzsch.

- P. lineatum* Osb. Infests the ruby-throated humming bird.
P. angulatum Kellogg. On the king bird or "bee Martin."
P. frenatum Nitzsch. Taken in New Jersey from the golden-crowned Kinglet.

TRINOTON Nitzsch.

- T. luridum* Nitzsch. Another of the duck parasites.
T. lituratum Nitzsch. Found on wild ducks and geese.

NITZSCHIA Denny.

- N. pulicaris* Nitzsch. Louse of the chimney swallow.

COLPOCEPHALUM Nitzsch.

- C. lari* Pack. Found on the great black-backed gull.
C. fuscipes Piaget. Also a parasite of gulls.
C. ochraceum Nitzsch. Found on the pectoral sandpiper.
C. flavescens Nitzsch. Louse of the swallow-tailed kite.
C. subpachygaster Piaget. Infests the great horned owl.
C. pustulosum Piaget. Parasite on the belted king-fisher.

MENOPON Nitzsch.

- M. tridens* Nitzsch. Yet another parasite of the mud hen; probably infesting also other allied birds.
M. consanguineum Piaget. A third species found on pelicans, and probably not a good Jerseyite.
M. crocatum Nitzsch. Taken on American woodcock and ring-tailed Merlin.
M. pallescens Nitzsch. Yet another parasite of the Bob White.
M. pallidum Nitzsch. Also found on the domestic fowl.
M. biserialim Piaget. Occurs with the preceding.
M. interruptus Osb. Parasitic on the common crow.
M. expansum Osb. Infests the bobolink.
M. crassipes Piaget. Found on the Baltimore Oriole.
M. dissimile Kellogg. Found on the purple Martin.
M. rusticum Giebel. A companion of the preceding on the same host.

Family GYROPIDÆ.

Similar to the preceding; but the tarsi have only a single claw and the species occur on mammals only.

GYROPUS Nitzsch.

G. ovalis Nitzsch. Occurs on the Guinea pig.

G. gracilis Nitzsch. Occurs with the preceding. Of course, these species are not really natives of the State, but the host animals are sometimes raised as pets and for other purposes and the parasites follow them, as do those of other domesticated animals.

Order ISOPTERA.

This order is characterized by having a flattened, loose-jointed body, the wings similar in size and shape, net veined, the metamorphoses incomplete. Only a single representative species occurs in New Jersey, the Termite, commonly known as a "white ant." These "white ants" live in

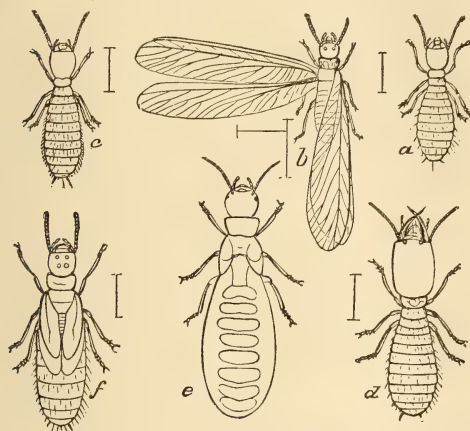


Fig. 9.—*Termes flavipes* or "white ant," showing the castes: *a*, larva; *b*, winged female; *c*, worker; *d*, soldier; *e*, large female; *f*, pupa. Natural size marked by lines.

colonies in dead or decaying stumps, logs or standing trunks or under stones in woodland. The forms most commonly seen are the "workers," which are whitish in color, have a large head without eyes, moderately developed jaws, a soft, somewhat flattened oval body, and are about one-quarter of an inch long. Scattered among them are somewhat larger individuals with long, sharp-pointed, brown-tipped mandibles, and these are the soldiers whose function it is to defend the colony. In the spring, yet larger, chestnut-brown forms with eyes and

developed wings are found, and these are the males and females which "swarm" in May or June, coming out of the nests in immense numbers and fluttering feebly in the bright sunshine for a short period.

They do not attack growing vegetation in our State, but are often found in partly decayed trees and may hasten the death of such. Sometimes they get into the woodwork of fences and buildings, and may then do considerably injury. Remedial measures must be adapted to the case in hand and may mean the injection of carbon disulphide, soaking with creosote or the actual removal of the infested wood. In all cases an effort should be made to locate and destroy the central nest from which the specimens come.

Our species is listed as follows:

Family TERMITIDÆ.

TERMES Linn.

T. flavipes Koll. Found commonly throughout the State.



Order CORRODENTIA.

This order is composed of a rather small number of soft-bodied insects with a large head which, while it is not sunken into the prothorax, has no distinct neck. The mouth parts are small, fitted for gnawing, which gave rise to the ordinal term, meaning "gnawers." The antennæ are long and slender, and the wings when present are large and frail. Many are wingless and some of these, occurring in houses, are known as book-lice, because they gnaw the calendered surface of the paper. They are found, usually, in dry, dusty places, feeding on starchy materials, and sometimes they attack museum specimens. They resemble lice in shape and appearance, but run rapidly and have the posterior thighs much enlarged. Cleanliness and naphthaline or carbolic acid are usually efficient agents in getting rid of these species.

The winged forms occur on the bark of trees overgrown with moss or lichens, which serve as food for the insects. The venation of the wings is very peculiar and tortuous, and as fliers the species are not remarkable, most of them preferring to drop to the ground when disturbed rather than use their wings. They are not harmful in any way, though when they occur in numbers sufficient to attract attention they are usually looked upon with suspicion.

No systematic collections in this order have been made in New Jersey, although it is known that we have a large number of species. The present list, therefore, is a compilation from the catalogue of Neuropteroid insects by Mr. Nathan Banks, and it includes those species of such general distribution as to make it reasonably probable that they are members of our fauna. It is certain that, when our species are once carefully studied, they will be found to be materially more numerous than here recorded.



Fig. 10.—*Psocus lineatus*. This represents the forms usually found on tree trunks.

Family PSOCIDÆ.

Sub-family ATROPINÆ.

TROCTES Burm.

T. divinatorius Müll. (*Atropos*) This or an allied species is common in houses among books and papers or in dusty corners throughout

the State. Sometimes it occurs in bureau drawers among linen, where its appearance excites apprehensions of parasites. They can be easily distinguished from the slow, crawling parasites by their rapid gait and long feelers. Naphthaline or camphor will keep them out, or drive them off where they have become established.

T. purpurea. Aaron. Taken near Philadelphia.

ATROPOS Leach (CLOTHILLA West).



Fig. 11.—A book-louse, *Atropos* sp. This represents the form commonly found in houses.

A. pulsatoria Linn. Occurs throughout the State. This is one of those forms known as the "death watch" from the belief that it produces the ticking sound often heard in old houses during the quiet of the night, and it was supposed to portend the death of one of the inmates. It has the same general habits as "*T. divinatorius*."

MYOPSOCNEMA End.

M. annulata Hagen. Recorded from the Eastern States.

HYPERETES Kolbe.

H. tessulatus Hagen. Recorded from Maine to Kentucky.

DORYOPTERYX Aaron.

D. pallida Aaron. Philadelphia, New York and District of Columbia.

LEPINOTUS Heyd.

L. inquilinus Heyd. Throughout the United States.

Sub-family PSOCINÆ.

OCELLATARIA Weber.

O. gravinympa Weber. Described from Pennsylvania.

AMPHIENTOMUM Hagen.

A. hageni Pack. Philadelphia; eastern United States, generally.

PTERODELLA Kolbe.

P. pedicularis Linn. (*Cæcilus*) United States, generally.

P. rufus Walsh. Eastern United States.

CÆCILIUS Curt.

- C. aurantiacus* Hagen. United States, generally.
C. definitus Aaron. Philadelphia.
C. impactus Aaron. Philadelphia.

PERIPSOCUS Hagen.

- P. madidus* Hagen. Eastern States.
P. permadidus Walsh. Eastern States.

MESOPSOCUS Kolbe.

- M. unipunctatus* Müll. (*Elipsocus*) Northern States; New York.

ELIPSOCUS Hagen.

- E. canadensis* Prov. Eastern States.
E. conterminus Walsh. Eastern States.
E. maculosus Aaron. Philadelphia.
E. pumilis Hagen. New York.

POLYPSOCUS Hagen.

- P. corruptus* Hagen. Eastern States.

MYOPSOCUS Hagen.

- M. lugens* Hagen. Eastern States; Mass. to Dist. Col.
M. sparsus Hagen. (*Psocus*) Eastern States.

PSOCUS Latr.

- P. atratus* Aaron. Philadelphia.
P. confraternus Banks. (*contaminatus* Hagen.) Eastern States.
P. inornatus Aaron. Philadelphia.
P. juvenilis Kolbe. Pennsylvania. This species with "*moestus*" and "*variegatus*" appeared as *Amphigerontia* in the previous edition.
P. leydyi Aaron. Eastern States.
P. moestus Hagen. Eastern States.
P. quietus Hagen. New York to Georgia.
P. semistriatus Walsh. Eastern States.
P. sexpunctatus Linn. Philadelphia.
P. slossonæ Banks. Eastern States.
P. striatus Wlk. Eastern States.
P. variabilis Aaron. Philadelphia.

CERASTIPSOCUS Kolbe.

- C. trifasciatus* Prov. (*Psocus*) Eastern States.
C. venosus Burm. (*Psocus*) Freehold (U S Ag), Egg Harbor City VIII, on cherry trunks. This or an allied species is frequently received as abundant on the bark of trees. It probably occurs throughout the State under suitable conditions.



Order PLATYPTERA.

This is an aggregation of loosely-jointed species, very few of which occur in our State. It is not numerous at best and, as represented with us, consists of rather large forms, the head as broad or broader than the square or oblong thorax, the mandibles large and sometimes prominent, antennæ many-jointed and often pectinated in the male. The wings are large, net-veined, the posterior not much the larger and folded only once near the anal angle when at rest beneath the anterior pair which covers them. The early stages are passed in the water, under stones or among the vegetation at the bottom of running streams. The larvæ are rather long and flattened, usually blackish, and breathe by means of a series of gill-tufts. When full grown they crawl on shore, burrow into the soil, or an old stump, or under a stone and pupate; the transformations are complete.

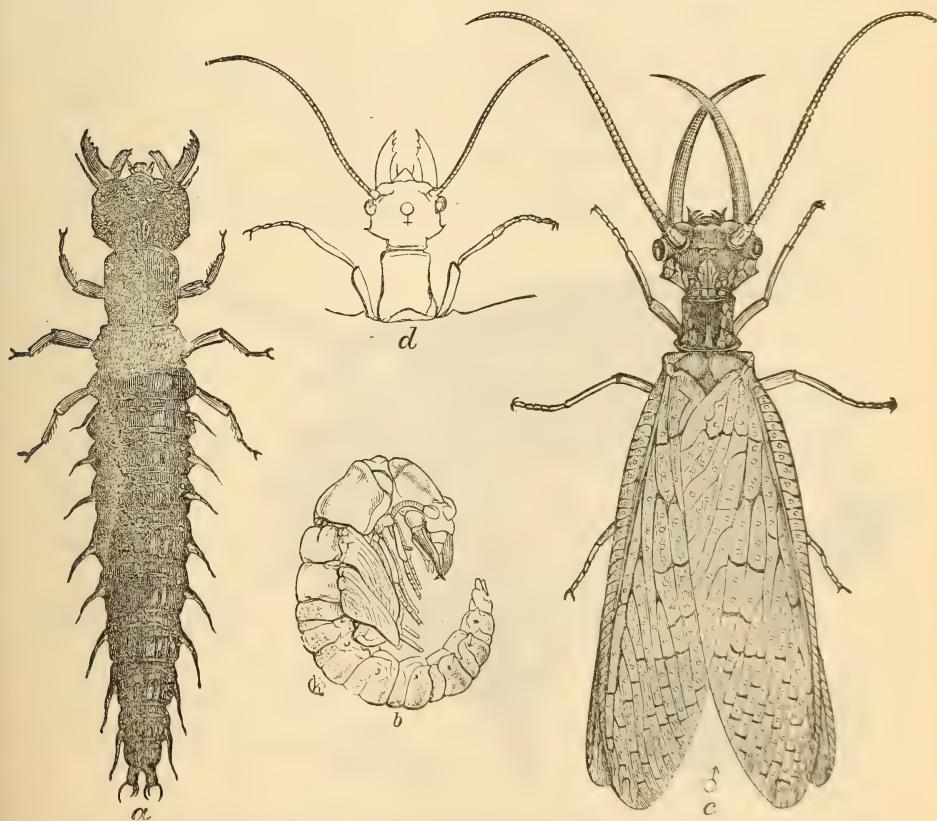


Fig. 12.—*Corydalus cornuta*; a, larva, "hellgramite" or "dobson"; b, pupa; c, male adult; d, head of female, showing the comparatively small jaws; natural size.

The species belonging here are of no economic importance. The adults are known as "fish-flies," and the larvæ of some of them make good bait for certain kinds of fish; otherwise they may be simply classed as "innocuous."

Family SIALIDÆ.

CORYDALIS Latr.

- C. cornuta* Linn. Throughout the State, but more common northwardly, late June to August. The larvæ are found under stones in running streams or brooks, and are known as "Dobsons" or "Hellgramites."

CHAULIODES Latr.

- C. angusticollis* Hagen. Middlesex County VII, 10 (Coll).
C. fasciatus Wlk. (*lunatus* Hagen.) Newfoundland VI, 6, So. Orange (Ds); Newark.
C. pectinicornis Linn. Chester, Paterson, Springfield, Orange Mts., Palisades V, 30, New Brunswick, Trenton VI, 10, 28, Anglesea, VII, 12 (Coll); Summit (U S Ag); Short Hills (Bt); Caldwell (Cr); Staten Island VII (Ds); seems to be the most common of our fish-flies.
C. rastricornis Ramb. Staten Island VI, 6 (Ds); Anglesea VI, 25 (Coll).
C. serricornis Say. Paterson VI, 6, New Brunswick, Mercer Co. VI, 10, Lakewood (Coll); Tuckerton VI, 14, common (Gr); Caldwell (Cr).

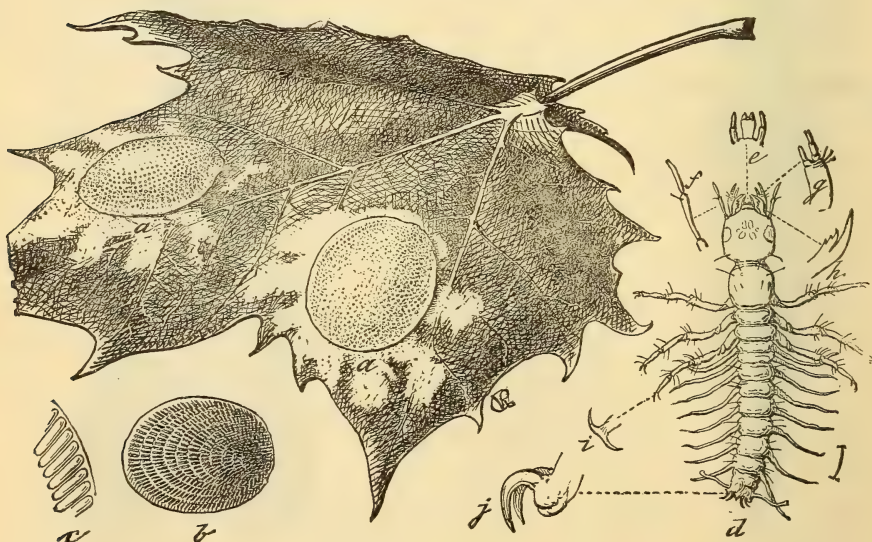


Fig. 13.—Early stages of *Corydalid cornuta*: a, egg-mass on leaf; b, same, detached, from the under side—natural size; c, single eggs, enlarged; d, newly hatched larva; enlarged; with structural details yet further enlarged e to j.

C. concolor Needh. Staten Island VII, 31, VIII, 4 (Ds).

SIALIS Latr.

S. infumata Newn. Lafayette V, 22, Greenwood Lake V, 30, Paterson VI, 6, New Brunswick VI, 1, Jamesburg VI, 16, Lahaway VI, 1, Atlantic County (Coll).

S. americana Ramb. Recorded from New York to Georgia



Order NEUROPTERA.

In its original or Linnæan scope this order included all the net or nerve-winged insects, hence was easy of definition. It is the most ancient of all the orders in this sense and the course of evolutionary divergence left its mark in the form of remnants, retaining the original wing type, but differing greatly in other respects. Recognizing its composite character, the first attempt to divide it was upon the method of transformation, and we had Pseudoneuroptera in which the metamorphoses were incomplete, and Neuroptera in which they were complete. This was unsatisfactory, because nothing in the adult indicated the character of its transformation and also because there were a number of transitional forms which were not easily classified. Hence the modern tendency to give each compact group ordinal rank, and that I consider the correct solution. There is as yet no entire agreement as to just where the lines of division should be made, and, while I have in general followed the classification in Mr. Nathan Banks' Catalogue of 1907, I have adopted the ordinal divisions that were indicated by my own studies along the lines of the introduction to this work. The ordinal terms are in general those used by Prof. Comstock.

As the order Neuroptera is limited here it contains insects that have a moderately compact thorax, the prothorax being well developed yet immovably connected with the mesothorax whatever its size, and no distinct neck between it and the head. There are four large net-veined wings which are not folded and are carried obliquely or roof-like when at rest. They are not densely hairy in any case, there is little or no difference in texture between the two pairs and usually not much in size. All of them are terrestrial in all stages and all are predatory in character as larva, although in one case at least with a tendency to parasitism, and in all there is a complete metamorphosis.

Several families occur in New Jersey, differing considerably in habits and appearance and most of them of small extent.

The Mantispidæ have only two representatives—remarkable looking forms with long prothorax and immense clasping fore-legs, much resembling the "Mantidæ" of the Orthoptera. The larvæ prey upon the eggs of spiders and are semi-parasitic, living in the egg-sac and becoming grub-like in form.

The Hemerobiidæ resemble the Chrysopidæ except that they are brown instead of green in color, and the larvæ, for their own protection, make sacs composed of the skins of their victims and dirt particles held together by threads of silk.

The Chrysopidæ, termed "lace-wing" or "golden-eyed flies" as adults, and "aphis lions" as larvæ, are well represented with us and distinctly useful. The term "aphis lion" refers to the habits of the larvæ which are spindle-shaped, a little flattened, with prominent, long mandibles which are grooved on the inner side. This larva grasps a plant-louse, punctures it and draws in its juices, the body being thrown away when exhausted.

The adults are green in color, the wings very transparent and delicate, justifying the term "lace-wing." The eyes are hemispherical, prominent and gold-bronzed, which gives base to the other of the common names. They have a peculiar sickening odor when handled, reminding one of an ill-kept urinal. The eggs of this, as well as the preceding family, are laid on long stalks by the adult and the larva spins a spherical silken cocoon. The species are decidedly beneficial and sufficiently numerous to be accounted a notable check to plant-lice increase.

The Coniopterygidæ are scarcely more abundant than the Mantispidæ. All those that I have seen are small, covered with a white mealy powder and have the hind wings unusually small. The larvæ, so far as their habits are known, feed on scale insects and resemble in form those of the "Chrysopidæ." So far as they go, therefore, the insects are beneficial.

The Myrmeleonidæ are "ant-lions" in the larval stage and very much larger as adults than any of the preceding. The larvæ are not so different in form and structure from those of the "Chrysopidæ," but they differ altogether in habit by living underground or building pits in sand or dry earth to serve as traps for the capture of such unwary insects as may tumble into them. They can scarcely be considered beneficial though, on the other hand they are certainly not injurious. The larvæ pupate in silken cocoons covered or mixed with sand grains. In the adults the antennæ are short, terminated by a gradual club at tip.



Fig. 14.—
Ant-lion.

The Ascalaphidæ are much larger insects, more hairy, with broad head and very long antennæ terminated in an abrupt club. The larvæ are like those of the preceding families, but build no pits and the species are always rare.

Family MANTISPIDÆ.

MANTISPA III.

M. brunnea Say. Jamesburg VII, 4 (Coll);
Lakehurst V-IX (div); Da Costa (Dke);
probably rare throughout South Jersey.

M. interrupta Say. Lakehurst VII, 4-30 (div);
Lahaway in June (Coll); Philadelphia.



Fig. 15.—*Mantispa* species
from above and in out-
line from side.

Family HEMEROBIIDÆ.

LOMAMYIA Banks.

L. flavicornis Wlk. (Berotha) Prospertown
IX, 22 (Coll); Lakehurst (Bno).

POLYSTÆCHOTES Burm.

P. punctatus Fabr. Philadelphia: United States generally.

P. vittatus Say. Recorded from New Jersey by Hagen.

HEMEROBIUS Linn.

- H. humuli* Linn. (*castanea* Fitch. = *tutatrix* Fitch.) New Brunswick, Princeton VI, 11, Anglesea IX, 4 (Coll); Staten Island VI (Ds). Fitch says it is everywhere common on chestnut, walnut and other trees.
- H. hyalinatus* Fitch. New York on pine, May to July.
- H. conjunctus* Fitch. (*pinidumus* Fitch.) Clementon VIII (Jn).
- H. stigmaterus* Fitch. Staten Island (Ds); Riverton III (Jn).

BORIOMYIA Banks.

- B. fidelis* Banks. (*Hemerobius*) Riverton VII (Jn); Lakehurst (Bno).
- B. longifrons* Wlk. = *alternatus* Fitch. (*Hemerobius*) New York, on pine and hemlock in June (Fitch).

SYMPHEROBIUS Banks.

- S. amicus* Fitch. (*Hemerobius*) New York, on peach trees, V-X (Fitch).

PSECTRA Hagen.

- P. diptera* Burm. Jamesburg V, 31 (Coll).

MICROMUS Ramb.

- M. posticus* Wlk. (*insipidus* Hagen.) Chester VIII, 11 (Coll); Westville VII, Riverton VII (Jn).

Family CHRYSOPIDÆ

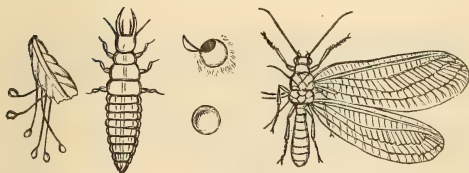


Fig. 16.—Lace-wing fly, *Chrysopa* sp., showing the stalked eggs from the side, the larva, the small round cocoon intact and with the lid opened, and the adult with wings of one side absent.

ALLOCHRYSA Banks.

- A. virginica* Fitch. (*Notochrysa*) Staten Island VIII (Ds).

CHRYSOPA Leach.

- C. albicornis* Fitch. Riverton VIII, Burlington County VIII.

- C. chlorophana* Burm. (*latipennis* Schneid.) Greenwood Lake V, 30, New Brunswick VI, 15 (Coll); Caldwell (Cr).
- C. harrisii* Fitch. Staten Island X, 18, Lakehurst IX (Ds).
- C. interrupta* Schneid. (*tabida* Fitch.) The common species at New Brunswick whose larva feeds on the slugs of elm-leaf beetles and other soft-bodied insects on tree trunks, fences, etc.
- C. lineaticornis* Fitch. New York and generally distributed.
- C. nigricornis* Burm. Staten Island VIII, 9 (Ds); New Brunswick VI, 6 (Coll).

- C. oculata* Say. (Illepidia Fitch.) Throughout the State VII-IX, and probably our most common species.
- C. plorabunda* Fitch. Chester, Anglesea IX, 6 (Coll).
- C. quadripunctata* Burm. (sulphurea Fitch.) Staten Island IX (Ds); New Jersey (Banks); probably throughout the State.
- C. rufilabris* Burm. Staten Island IX, 11 (Ds); New Brunswick IX, 18 (Coll).
- C. ypsilon* Fitch. New Brunswick IX (Coll).



Fig. 17.—Lace-wing fly and its eggs from the side; wings shown as held when the insect is at rest.

Family CONIOPTERYGIDÆ.

CONIOPTERYX Curt.

- C. vicina* Hagen. Lakehurst (Bno).

MALACOMYZA Wesm.

- M. westwoodii* Fitch. Del. Water Gap VII, 12 (Coll); South Jersey on oak VII (Sm); Lakehurst (Bno).

Family MYRMELEONIDÆ.

ACANTHACLISIS Ramb.

- A. americana* Dru. Sandy Hook VIII, IX rare (Bt); Anglesea VIII, 1, one specimen (Coll).

MYRMELEON Linn.

- M. crudelis* Wlk. (rusticus Hagen.) Staten Island VII, Lakehurst VII (Ds); Lahaway VI, 28, VII, 3 (Brakeley).

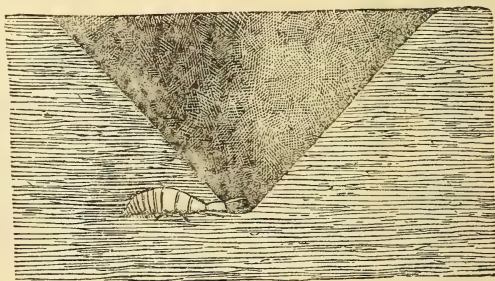


Fig. 18.—Section through the pit of ant-lion, showing the insect in position at the bottom.

PSAMMOLEON Banks.

- P. guttipes* Banks. Lakehurst IX (Engelhardt).

GLENURUS Hagen.

- G. gratus* Say. (Dendroleon) Taken at Philadelphia, and certain to occur in New Jersey.

DENDROLEON Brauer.

- D. obsoletum** Say. New Brunswick VII, 24; Jamesburg VII, 21 (Coll); Lahaway VII, 4, IX 20 (Brakeley).
D. pumilis Burm. (*Brachynemurus*) Staten Island, a small species and usually rare (Ds).

BRACHYNEMURUS Hagen.

- B. abdominalis** Say. Staten Island VI-IX, Lakehurst VI, VII (Ds); New Brunswick VII, 23, common, Jamesburg VII, 21, Anglesea VII, 12, IX, 4 (Coll); Shark River VII, 9, (Jn); Lahaway VI, 28, VIII, 17 (Brakeley).

Fig. 19.—*Myrmeleon* sp. Winged adult.**CRYPTOLEON Banks.**

- C. nebulosum** Oliv. = **consersa** Ramb. (*Maracanda*) Jamesburg VI, Lakehurst VI, VII (Ds); Lahaway VII, 8-18 (Brakeley).
C. signata Hagen. Almost certain to occur in New Jersey.

Family ASCALAPHIDÆ.

NEUROPTYNX McCl.

- N. appendiculatus** Fab. Lakehurst VII (Ds); DaCosta VII, 16 (Dke).

ULULODES Currie.

- U. hyalina** Latr. New Brunswick VII, 9, Anglesea IX, occasional at light (Coll).
U. 4-punctata Burm. Staten Island, Lakehurst VII (Ds); New Brunswick VIII, 3, Anglesea (Coll); Belmar VII, 9 (Jn).

COLOBOPTERUS Burm.

- C. excisus** Hagen. Belmar VII, one specimen (Jn).

Order MECOPTERA.

The "scorpion flies" are a curious remnant of what I believe was the ancestral type from which the orders Hymenoptera and Diptera were developed. They have narrow, net-veined wings, the cross-veins rather few in number, laid flat across the back when at rest. The mouth parts are mandibulate and set at the end of a proportionately long beak, so

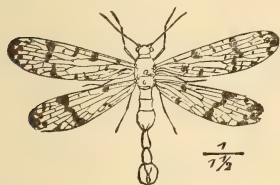


Fig. 20.—A male scorpion fly;
Panorpa sp., somewhat
enlarged.

that the order is readily recognizable. In the males of "*Panorpa*" the abdomen is furnished with a curiously jointed forceps, curved upward so that it somewhat resembles the tail and sting of a scorpion, and that gives the order its common name. The flies are predatory, and feed on a variety of small insects.

They are never common in my experience, but are not really rare, and in some locali-

ties are freely taken by collectors. The species of "*Boreus*" occur in late winter and very early spring, often on the surface of snow after a short period of mild weather.

The larvæ are caterpillar-like in shape, have 8 pairs of fleshy pro-legs, live in damp soil and are predatory in habit. Taken as a whole, the order is of no economic importance, and none of the species are at any time injurious, directly or indirectly.



Fig. 21.—Larva of a scorpion
fly enlarged.

PANORPA Linn.

- P. confusa* Westw. Orange Mts., Lahaway, Anglesea VII, 20 (Coll).
- P. maculosus* Hagen. Hopatcong VII, 6, Del. Water Gap VII, 12, Greenwood Lake V, 30, Lakehurst VII, 7 (Coll); Ft. Lee Dist. IX, 9 (Bno).
- P. nebulosus* Westw. Del. Water Gap VII (Jn); Passaic VI, 8 (Coll); Staten Island VI (Ds).
- P. rufescens* Ramb. (*debilis* Westw.) Del. Water Gap VII (Jn); Little Falls (Ds); Woodbury V, 28, Pitman Grove VIII, 4 (Acad).
- P. venosa* Westw. Sparta VII (Ds).

BOREUS Latr.

- B. brumalis* Fitch. Staten Island XII, 6 (Ds); on snow, New York, April.
- B. nivoriundus* Fitch. New York, on snow, in early spring.

BITTACUS Latr.

- B. apicalis** Hagen. Eastern States generally.
- B. occidentis** Wlk. Pennsylvania and Eastern States generally.
- B. strigosus** Hagen. Common near Philadelphia (Haim).

MEROPE Newn.

- M. tuber** Newn. Atlantic States generally.

Order TRICHOPTERA.

The "caddice" or "case-flies" are so named from the fact that the larvæ make cases or tubes of stones, sticks or other fragments of vegetable, animal or mineral matter among which they live. They are aquatic, resemble caterpillars in shape, but have the thoracic legs very long, the others very short or obsolete, and the hind body soft because of the protection afforded by the case. Usually they frequent running brooks, streams or ditches, but some live in water that is sluggish or almost stagnant. The adults have a free head with distinct neck, a compact thorax, an abdomen without anal appendages, and four net-veined wings, the posterior folded under and covered by the anterior. The antennæ are usually very long, the fore-wings are narrower than the hind-wings, often a little thicker in texture and covered with a fine hair, which sometimes becomes scale-like. The mouth parts are mandibulate in type, but are rarely well developed, and in many cases so nearly obsolete as to be entirely useless for feeding purposes. They have many resemblances to the Lepidoptera, and some of the species of either order may be readily taken for members of the other. It is believed that in the Trichoptera we have the direct ancestors of the Lepidoptera.



Fig. 22.—Caddice-fly cases of varying types.

Collections in this order are not much more complete than they were at the time of the previous edition, and comparatively few new species have been added. Some of the species added as probabilities have been verified, and a very few of these have been omitted as unlikely to occur from better knowledge.

Family PHRYGANEIDÆ.

PHRYGANEA Linn.

- P. interrupta* Say. Caldwell (Cr); Anglesea VII, 12 (Coll); "New Jersey" is the type locality.
P. vestita Wlk. Staten Island V (Ds).

NEURONIA Leach.

- N. angustipennis* Hagen. Newark, Jamesburg VII, 4 (Coll).
N. concatenata Wlk. Recorded from Canada to Florida.
N. dossuaria Say. Buena Vista VI (Jn).
N. ocellifera Wlk. Caldwell (Cr); Staten Island VI, VII (Ds); Orange Mts., Jamesburg, Anglesea VI, 10-21 (Coll).
N. postica Wlk. Caldwell (Cr); Chester VII, 8, Palisades V, 30, Orange Mts., New Brunswick VI, Lahaway VI, 1, VII, 7 (Coll).
N. semifasciata Say. Caldwell (Cr); Orange Mts. (Bt).
N. stygipes Hagen. Staten Island, Ft. Lee V (Ds); Paterson IV, 21, So. Orange IV, 18, Monmouth Jn. V, 9 (Coll).

Family LIMNEPHILIDÆ.

LIMNEPHILUS Leach.

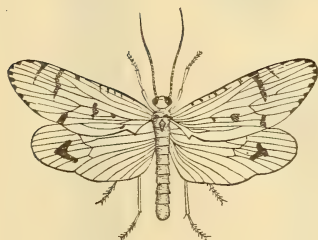


Fig. 23.—A caddice-fly, *Limnephilus rhombicus*; enlarged.

- L. submonilifer* Wlk. = *pudicus* Hagen. (*Goniataulius*) Newark X, 30, New Brunswick, Prospertown VI, 1, Anglesea IV, 26 (Coll). Riverton IV (Jn).

PLATYCENTROPUS Ulm.

- P. maculipennis* Kolen. (*hostis* Hagen.) Jamesburg VII, 4 (Jn); Manchester VI (Ds); Barnegat Bay Dist. VI, 4, Lahaway VI, 24 (Coll).

HALESUS Steph.

- H. argus* Harr. Staten Island VI (Ds).

PYCNOPSYCHE Banks.

- P. guttifer* Wlk. (*Halesus*) Occurs from Canada to Georgia; certain to be found in New Jersey.
P. scabripennis Ramb. (*Stenophylax*) Lakehurst VIII, 23 IX (div).

ALLOPHYLAX Banks.

- A. punctatissimus* Wlk. Chester (Coll).

PLATYPHYLAX McLach.

- P. lepida* Hagen. Recorded from Pennsylvania and the N. E. States.
P. subfasciata Hagen. Philadelphia and eastern States generally.

CHILOSTIGMA McLach.

- C. difficilis* Wlk. (*Cryptothrix*) Staten Island XI, XII (Ds); Lahaway XI, 9 (Coll).

CHÆTOPTERYGOPSIS Stein.

- C. parvula* Banks. (*Oecetina*) New Brunswick IX, 18.

Family RHYACOPHILIDÆ.

RHYACOPHILA Pict.

- R. terminata* Banks. Delaware Water Gap (Slosson).
R. torva Hagen. Delaware Water Gap VII (Jn).

CHIMARRHA Leach.

- C. aterrima* Hagen. Lafayette V, 23, Newark V, 12, Barnegat Bay Dist. VI, 14 (Coll).

Family SERICOSTOMATIDÆ.

BRACHYCENTRUS Curt.

- B. fuliginosus* Wlk. (*incanus* Hagen.) Paterson V, 1, New Brunswick IV, 21, IX, 18 (Coll).

HELICOPSYCHE Hagen.

- H. annulicornis* Banks. "New Jersey" (Banks).
H. borealis Hagen. New Brunswick IX, 18 (Coll).

LEPIDOSTOMA Ramb.

- L. togata* Hagen. Del. Water Gap (Slosson).

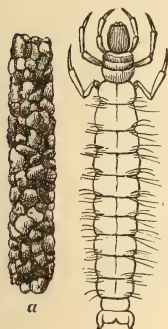


Fig. 24.—Larva of caddice-fly and its case; enlarged.

Family CALAMOCERATIDÆ.

HETEROPLECTRON McLach.

- H. borealis* Prov. Del. Water Gap (Slosson); Passaic VI, 8 (Coll).

GANONEMA McLach.

- G. americana* Wlk. (*Sericostoma*) New Brunswick, Cumberland Co. VI (Coll).

Family LEPTOCERIDÆ.

BERÆA Steph.

B. nigritta Banks. Clementon VIII (Jn).

MOLANNA Curtis.

M. cinerea Hagen. "Eastern States;" sure to occur in New Jersey.

LEPTOCERUS Leach.

L. mentiens Wlk. New Brunswick VI, 23, VIII, common (Coll).

L. resurgens Wlk. (**Setodes**) New Brunswick VI, 23 (Coll).

L. transversa Hagen. Will probably be found in South Jersey.

TRIÆNODES McLach.

T. flavescens Banks. Del. Water Gap (Slosson); New Brunswick IX, 18 (Coll); this is the species listed as "venusta" in the last edition.

T. ignita Wlk. New Brunswick IX, 18 (Coll); Riverton VII (Jn).

LEPTOCELLA Banks.

L. albida Wlk. (**Setodes**) Sure to be found in New Jersey.

L. exquisita Wlk. New Brunswick IX, 18 (Coll).

L. uwarowii Kolen. Riverton VII (Jn).

ÆCETINA Banks.

Æ. avara Banks. New Brunswick VI, 23, IX, 19, common (Coll).

Æ. flaveolata Hagen. (**Setodes**) New Brunswick.

Æ. fumosa Banks. Staten Island VI (Ds).

Æ. guttata Banks. New Brunswick IX, 18 (Coll).

Æ. incerta Wlk. New Brunswick VI, 1-22, IX, 18 (Coll); Westville VI, Riverton VII (Jn).

Æ. parvula Banks. New Brunswick IX, 18.

MYSTACIDES Latr.

M. nigra Linn. New Brunswick, and probably throughout the State.

M. sepulchralis Wlk. Del. Water Gap VII, 12, New Brunswick VI, 23 (Coll).

Family HYDROPSYCHIDÆ.

MACRONEMA Pict.

M. zebrata Hagen. New Brunswick VI, 23, very common (Gr).

HYDROPSYCHE Pict.

- H. alternans** Wlk. Chester VIII, 19 (Coll); Caldwell, common (Cr).
H. analis Banks. New Brunswick VI, Lahaway VII, 21 (Coll).
H. phalerata Hagen. New Brunswick V, 3, VI, 23, VII (Coll).
H. scalaris Hagen. New Brunswick (Coll).
H. sordida Hagen. Eastern States generally.

PLECTRONEMIA Steph.

- P. confusus** Hagen. (*Polycentropus*) Staten Island VI (Ds); Jamesburg V, Lahaway V (Coll).

PHYLOCENTROPUS Banks.

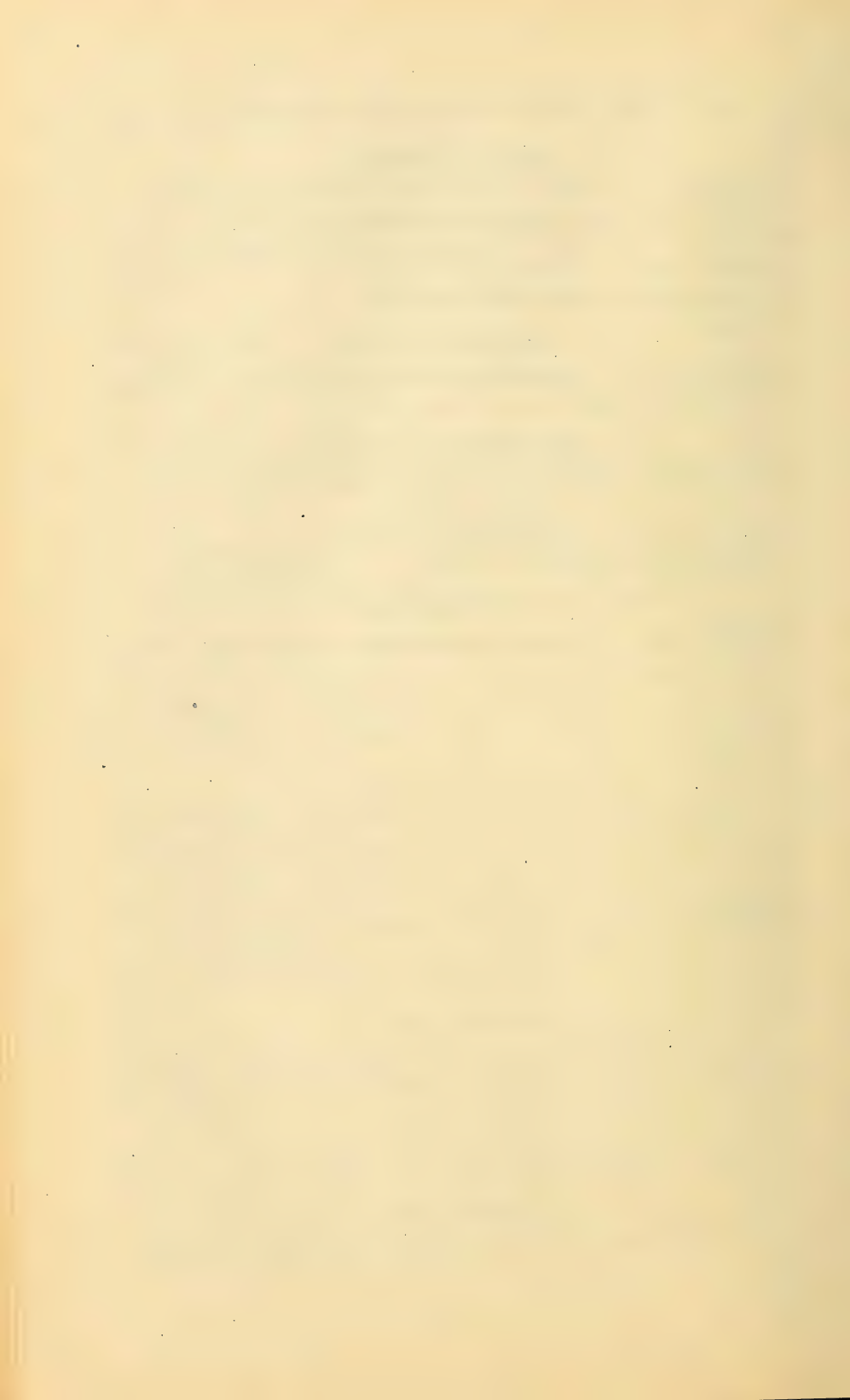
- P. lucidus** Hagen. (*Polycentropus*) Chester VIII, 17 (Coll).

PHILOPOTAMUS Leach.

- P. distinctus** Wlk. Caldwell, rare (Cr).

PSYCHOMIA Latr.

- P. flavida** Hagen. Canada to Virginia, and sure to occur in New Jersey.



Order ODONATA.

The Odonata or "dragon flies" are predatory in all stages, and none of them are, therefore, injurious to the agriculturist. Some of them are more or less beneficial in the adult stage as destroyers of injurious or annoying species, and their practice of taking mosquitoes has given them the name "mosquito-hawks." Their habits of flying by day only, and preferably in sunny places, limits their usefulness against the nocturnal pests very decidedly, and makes them practically useless in any attempt to control mosquito breeding. Their appearance and habits have always aroused interest, and often dread, as the common names "snake doctor" and "devil's darning needle" testify, and many a tale of their dangerous power is current. As a matter of fact, the insects are entirely harmless, and can neither sting nor bite, the mouth being so peculiarly constructed that the insect can chew only what can be gotten into the buccal cavity itself.

The eggs are laid on or under the surface of the water, and the larvæ are as voracious and formidable in appearance as the adults. The lower lip is hinged, capable of being extended well beyond the head, and almost any soft-bodied water insect coming within reach is liable to be captured and eaten. Mosquito wrigglers furnish a large percentage of the food of some species, and in permanent pools such larvæ cannot maintain themselves in any number.

The list of species in the last edition was prepared by Dr. Philip P. Calvert, of the University of Pennsylvania, who has also supplied additional notes to the present edition. His absence from the country during the time the list was prepared for the printer, and while it was passing through the press has prevented his looking it over in final form, and he is not to be charged with errors appearing in it, but is to be credited with the determination of the material and the general arrangement as it now stands, as well as all records not otherwise acknowledged.

The list of species and varieties has been increased from 90 to 112, and there probably is no other order more thoroughly and completely known in New Jersey. The labors of Messrs. Daecke and Davis, in addition to those of Dr. Calvert, have done much to bring the list to its present state of completeness.

Family AGRIONIDÆ.

Sub-family CALOPTERYGINÆ.

CALOPTERYX Leach.

C. maculata Beauv. Throughout the State except in the Appalachian V, 28-VIII, 9, locally not rare.

- C. apicalis* Burm. Iona V, 8, Bamber VII, 30, Malaga VI, 27, Browns Mills VI, 24 (Dke); Weymouth VII, 30-VIII, 15 (div); Toms River (Bt); Raccoon Creek VIII, 3, Patcong Creek VIII, 25 (C); not rare.

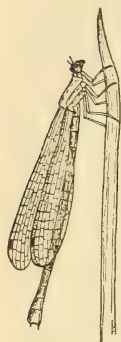


Fig. 25.—An adult Agrionid in a resting position; natural size.

HETÆRINA Hagen.

- H. americana* Fab. Paterson IX, 1 (Gr); Berkshire, Morris Co. IX, 12, Patcong Creek VIII, 25 (C); Bamber IX, 9 (Dke); South Jersey cranberry bogs (Sm); locally common.

Sub-family AGRIONINÆ.

LESTES Leach.

- L. congener* Hag. Staten Island IX, X, XI (Ds).
L. unguiculatus Hag. Bergen Hill (Hag); Staten Island VII, 15, ovipositing (Ds); DaCosta VII, 20, Hammonton IX, 6 (Dke); Minnisink IX, XI, 2, Lucaston VII, 16 (C); Peermont VI, 16 (Vk); Anglesea VI, 19-VIII, 21 (Sm).
L. forcipata Ramb. Piedmont Plain and southward throughout the Delaware Valley and pine barrens, but not in coast strip or maritime IV, 30-IX, 8.
L. rectangularis Say. Throughout the State, except Appalachian VI, 3-IX, 10; many records from all regions.
L. vigilax Selys. Highlands, southward through pine barrens, but no records from the coast strip or maritime VII, 10-IX, 14.
L. inæqualis Walsh. Morris Co. VII, 10 (Jn); Staten Island VI, VII (Ds); Riverton VII, 19 (Satterthwaite); Kirkwood VI, 16 (C).
L. eurinus Say. Staten Island (Ds).

ARGIA Ramb.



Fig. 26.—An Agrionid nymph, *Lestes rectangularis*; somewhat enlarged.

- A. putrida* Hag. Del. Water Gap VII, 7, Dunnfield Creek VII, 14, Chatham VIII, 8 (C); Norman-nock VII, 23, Little Falls VII, 8 (Ds); Newark, Gloucester Co. VII (Sm).
A. violacea Hag. Throughout the State, except that there are no records from the Appalachian nor the maritime VI, 8-IX, 6.
A. translata Selys. Hanks Pond, near Newfoundland IX (Ds); Hopatcong VII (Rhoades).
A. tibialis Hag. Atco IX, 4 (H); New Jersey VII, 4 (A N S); Browns Mills VII, 29, Bamber VIII, 11 (Dke).

- A. apicalis** Say. Staten Island (Ds); Haddonfield VIII (R); Almonesson VII, 17, Grenloch VII, 29 "in copula," Mullica Hill VIII, 3 (C); Laurel Springs VII, 21 (Dke).
- A. bipunctulata** Hagen. Newfoundland VI, 4 (Ds); Haddonfield VIII (R); Atco VII, 12 (N); Berlin VII, 17, Albion VI, 1, Lucaston VI, VIII, 10, Manumuskin V, 21 (C); Browns Mills VII, 21, Toms River VII, 12 (Dke).

CHROMAGRION Needh.

- C. conditum** Hag. Lakewood V, Iona V, 26, Browns Mills V, 21 (Dke); Hewitt VI (Ds).

NEHALENNIA Selys.

- N. irene** Hag. Great Piece Meadow VIII, 3 (Coll); Ft. Lee VI, 23, Browns Mills VII, 5, DaCosta VII, 19 (Dke.); Staten Island VI, Lakewood VI (Ds); Berlin VII, 17 (C).
- N. posita** Hag. Throughout the State V, 2-VIII, 30, locally common.
- N. gracilis** Morse. Iona VII, 13, Hammonton VII, 17 (Dke).
- N. integricollis** Calv. Malaga VI, 27, one ♀ (Dke).

AMPHAGRION Selys.

- A. saucium** Burm. Dunker Pond VII, Staten Island VI (Ds); Plainfield V, 18, Jamesburg VII, 4, Lahaway (Coll); Riverton V, 30 (CG); Westville VI, 16, Clementon V, VI (Jn); Woodstown V, 28 (C); Lucaston VI, 13, Iona V, 24 (Dke).

ENALLAGMA Charp.

- E. durum** Hag. Westville VIII, 28 (W); Alloway VIII, 28, Bargaintown VIII, 24, Petersburg VIII, 25 (C); Ocean Co. VIII, (R); Toms River VII, 12 (Dke); Lavallette V, 21 (Vk).
- E. doubledayi** Hag. New Jersey, near Egg Harbor River (Uhler); Ocean Co., Manahawkin or Tuckerton VIII (R).
- E. civile** Hag. Piedmont Plain and southward; most abundant through the pine barrens and in the coast strip; VI, 11-IX, 22; recorded also from Newfoundland VII (Ds), and probably rare in the Highlands.
- E. carunculatum** Morse. Lake Hopatcong VII, IX, 8 (div); Newfoundland VII (Ds).
- E. aspersum** Hag. Bergen Hill (Hag); Staten Island VI-VIII (Ds); Haddonfield VIII (R); DaCosta VIII, 19; Lucaston VI, 14-IX, 7, Hammonton VIII, 23, Manumuskin IX, 15 (Dke); Seaville VII, 12, Cape May V, 30 (Sk).
- E. travium** Selys. Clementon VI, 4, Almonesson VII, 17 (C); Lucaston VII, 2 (Dke).
- E. geminatum** Kellicott. Lake Hopatcong IX, 14, Kirkwood V, 25, mostly ♂, VI 16, "in copula," Almonesson VII, 17, Clementon VII, 22, Mullica Hill VIII, 3, West Creek Pond VIII, 26, Manumuskin VI, 21 (C); Jamesburg VII, 4 (Lt); DaCosta V, 17, Lucaston VI, 27, VII, 2 (Dke).

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- E. divigans** Selys. Merchantville V, 26, Iona VI, 8 (Dke); Kirkwood VI, 16 (C).
- E. exsulsans** Hag. Del. Water Gap VII, 12 (Jn); Jamesburg (Sm); Three States Point VII, 21, Patcong Creek VIII, 25, Mullica Hill VIII, 3, "in cop" in narrow parts of Raccoon Creek, but not at Mill Pond (C); Merchantville V, 26, Manumuskin VI, 21 (Dke).
- E. signatum** Hag. Highlands, Piedmont Plain, Delaware Valley and extending a little into the pine barrens along its western border, VI, 6-IX, 6.
- E. pollutum** Hag. Lake Hopatcong IX, 14, Clementon VI, 4, VII, 22, IX, 22 (C).
- E. pictum** Morse. Pine barrens VI, 6-VIII, 29, extending a little into the Delaware Valley where the two join; "in cop" VII, 22, VIII, 26.

TELAGRION Selys.

- T. dæckii** Calv. Malaga VI, 27, 1 ♂, Manumuskin VI, 23 (Dke).

ISCHNURA Charp.

- I. verticalis** Say. Recorded, not rarely, from all regions except the Apalachian IV, 21-VIII, 29.
- I. kellicotti** Williamson. Clementon IX, 22, Hammonton Lake VIII, 23, Alloway VIII, 28, Bridgeton VIII, 27, Patcong Creek VIII, 25, West Creek Pond, Eldora VIII, 26, Millville VIII, 28, Bargaintown VIII, 25 (C); Tuckerton VIII (R).
- I. ramburii** Selys. Staten Island IX, X (Ds); pine barrens and coast strip, extending a little into the Delaware Valley VII, 2-VIII, 29.

ANOMALAGRION Selys.

- A. hastatum** Say. Highlands southward throughout the State; most abundantly recorded from the pine barrens near the shore, V-IX, 15.

Family AESCHNIDÆ.

Sub-family GOMPHINÆ.

HAGENIUS Selys.

- H. brevistylus** Selys. Newfoundland VII (Ds); Franklin Furnace—Wildwood Lake (C); Browns Mills Jnc. VI, 24, Grt. Egg Harbor River, Weymouth VIII, 16, Bamber VI, 24, VIII, 11 (Dke).

OPHIOGOMPHUS Selys.

- O. johannus** Needh. Hewitt VI (Ds).
- O. rupinsulensis** Walsh. Dover (Jn); Ramapo Mts., near Halifax VI, 12 (Ds).

GOMPHUS Leach.

- G. parvulus** Selys. Ramapo V, 31 (Ds); Hewitt V, 31 (Watson).
G. villosipes Selys. Great Piece Meadow V, 23 (Coll).
G. exilis Selys. Highlands, pine barrens and coast strip; many records V-VII; none from Piedmont Plain or Delaware Valley; Staten Island V-VII (Ds).
G. plagiatus Selys. Trenton VIII, 8 (Coll); Edgewater Park VII, 29, Manumuskin IX, 3 (Dke).
G. albistylus Hag. Lucaston VI, 3 (Dke).
G. brevis Hag. Browns Mills V, 21 (Dke).
G. sordidus Hag. Newfoundland VII, 9 (Ds); between Clementon and Blackwood VI, 4 (C).
G. furcifer Hag. Hewitt VI, 19 (Ds).
G. spicatus Selys. Newfoundland V, 19, VII (Ds).

PROGOMPHUS Selys.

- P. obscurus** Ramb. Lakehurst VII, 21 (Ds); Browns Mills VI, 25, VII, 21, Bamber VII, 13 (Dke).

DROMOGOMPHUS Selys.

- D. spinosus** Selys. Dunnfield Creek VII, 14 (C); Lake Hopatcong VII-IX, 14 (div); Sparta VII, Newfoundland VI (Ds).

Sub-family **CORDULEGASTERINÆ**.**CORDULEGASTER** Leach.

- C. maculatus** Selys. Staten Island V, 30, VI, 17 (Ds); Lacey V, 27 (Dke).
C. diastatops Selys. Lake Hopatcong VI, Hewitt VI, Lakehurst V (Ds).
C. obliquus Say. Lake Hopatcong VI, 17 (Watson).

Sub-family **ÆSCHNINÆ**.**EPIÆSCHNA** Selys.

- E. heros** Fab. Throughout the State III-X, sometimes very abundant along shore; not actually recorded from the Appalachian and sparingly from the Highlands; but from all portions of the pine barrens.

BOYERIA McLach.

- B. vinosa** Say. Sparta VII, Newfoundland VII. IX, Staten Island VII, Lakehurst VII (Ds); Caldwell (Cr); Bound Brook, in R. R. ear (C); Mt. Holly VII (A N S); Clementon (Gr); Lacy VII, 14 (Dke).

BASIÆSCHNA Selys.

- B. janata** Say. Newfoundland V, Great Notch V, Paterson V, Staten Island V, 2, Lakehurst V (Ds); Medford (Banks); common in pine barrens IV, 24-V, 13 (Dke).

GOMPHÆSCHNA Selys.

- G. furcillata** Say. Hewitt VII, Lakehurst V, VI (Ds); Sussex Co. (B. Long); Browns Mills V, Iona IV, DaCosta V (Dke).
var. **antelope** Hag. Newfoundland VI, 22 (Ds); New Brunswick V, 22 (Coll); Clementon VI, 6 (Dke); Sea Isle, 1 ♀ in wash-up VI, 25 (C).

ÆSCHNA Fab.

- Æ. juncea** L., var. **verticalis** Hag. Staten Island VI, IX, X (Ds); Ft. Lee (Dke).
Æ. clepsydra Say. Dunnfield Cr VII, 14 (C); Newfoundland IX (Ds).
Æ. umbrosa Wlk. (**constricta** Say.) Dunnfield Cr VII, 14 (C); Normanock VII, Staten Island VI, IX, X (Ds); Haddonfield IX (R); Delair X, 19, Lucaston X, 10 (Dke); Anglesea IX, 6 (Sm).
Æ. grandis L. Bergen Hill, 1 ♂ (Hag), and probably an introduced example. The species is European.

ANAX Leach.

- A. junius** Dru. Throughout the State IV, 23-X 3, locally common.
A. longipes Hag. Staten Island VI, 5, VIII, 9, Orange (Ds); Lucaston VI, 27, VII, 22, Bamber (Dke).

Family **LIBELLULIDÆ**.

Sub-family **CORDULINÆ**.

DIDYMOPS Ramb.

- D. transversa** Say. Highlands, Piedmont Plain V-VII, many localities; Riverton IV, 23 (Jn); Mt. Holly V, 13 (A N S); Woodbury IV, 29 (Kp); Hainesport V, 7 (Dke).

MACROMIA Ramb.

- M. illinoisensis** Walsh. Del. Water Gap VII, 9 (Jn); Newfoundland VII, Echo Lake VII, 2 (Ds); Bamber VII, 13, Browns Mills VII, 4 (Dke).

EPICORDULIA Selys.

- E. princeps** Hag. Hopatcong IX, 14 (C); Newfoundland VI, VII, Singac VI (Ds); New Brunswick VII, 10 (Coll); Almonesson VII, 17 (C).

TETRAGONEURIA Hag.

- T. semiaquea** Burm. Lakehurst V, VI (Ds); Kirkwood VI, 16 (C); Clementon V (div); Lucaston V, 30, Manumuskin V, 10-23 (Dke); Anglesea V, 11 (Lt)
- T. spinosa** Hag. Great Notch V, 5 (Lv); Clementon V, 27, VI, 3, Laurel Springs IV, 21, Iona IV, 20 (Dke).
- T. cynosura** Say. Newfoundland VI, VII, Staten Island V-VII, Lakehurst VI (Ds); Clementon V-VII (div); Blackwood VI, 4, Kirkwood VI, 16 (C).

HELOCORDULIA Need.

- H. uhleri** Selys. Florence IV, 23 (C); Lakehurst V (Ds); Browns Mills V, 21, Iona IV, 20, Manumuskin IV, 5 (Dke).

NEUROCORDULIA Selys.

- N. obsoleta** Say. Del. Water Gap VII, 10 (Jn); Lake Hopatcong VI, 17, VII, 4, IX, 14 (div).

DOROCORDULIA Need.

- D. lepida** Hag. Lakehurst V, VI (Ds); Jamesburg VII, 4, Iona V, 26, VI, 8, Browns Mills VI, 24 (Dke).
- D. libera** Selys. Paterson V, 24 (Coll); Normanock VII, 23 (Ds).

SOMATOCHLORA Selys.

- S. filosa** Hag. Petersburg VIII, 30 (C); Iona VIII, 25, Manumuskin IX, 3, Anglesea IX, 8 (Dke); Cape May Co. IX, 20 (Sm).
- S. provocans** Calv. DaCosta VII, 16, Formosa bog VII, 22, Bamber VII, 13, Weymouth VII, 30 (Dke).
- S. tenebrosa** Say. Jamesburg VII, 4, Lakehurst IX (Ds); Clementon IX, 6 (C); Malaga VII, 27, Bamber VII, 13, Browns Mills VII, 5 (Dke).

Sub-family **LIBELLULINÆ**.**PANTALA** Hagen.

- P. flavescens** Fab. Staten Island VII-IX (Ds); Lucaston VIII, 6, Cape May IX, 21 (Dke).
- P. hymenæa** Say. Sea Isle City VIII, 15 (Lt).

TRAMEA Hag.

- T. carolina** L. Bergen Hill (Hag); Staten Island V-IX (Ds); and southward through the pine barrens V-IX, along the coast strip but scarcely entering the Delaware Valley.
- T. lacerata** Hag. Staten Island V-IX (Ds); Haddonfield VIII (R); Ocean Co. (Sm).

LIBELLULA Linn.

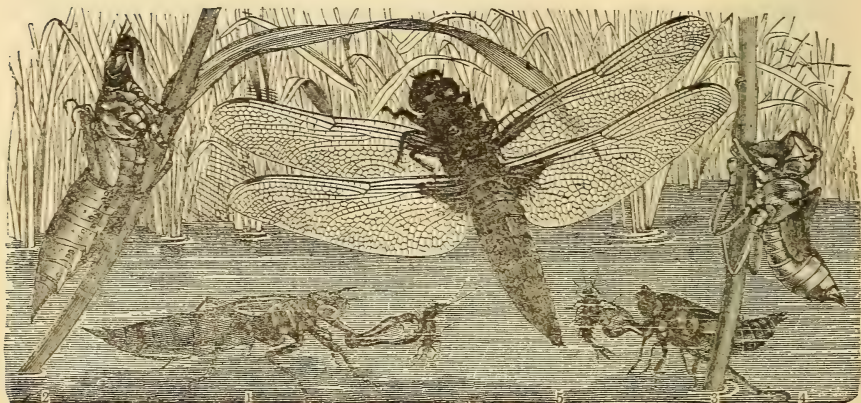


Fig. 27.—*Libellula* sp., showing all stages: 1, larva with jaws extended; 2, pupa shell, from which larva has issued; 3, active pupa capturing its prey; 4, pupa on stalk, ready to transform; 5, adult dragon fly.

- L. luctuosa* Burm. (*basalis* Say.) Lake Hopatcong (Rhoads); Sparta VII, Staten Island VI, VII (Ds); So. Orange IV, 18, New Brunswick VI, 28 (Coll); Riverton VII (Jn); Haddonfield VIII (R); Westville VII (div); Mullica Hill VIII, 3 (C); National Park VIII, 4, Laurel Springs VII, 21 (Dke).
- L. auripennis* Burm. Staten Island V-VII (Ds); Petersburg VII, 23, Tuckahoe VII, 21 (C); along shore, Point Pleasant to Cape May VII, VIII.
- L. flava* Ramb. Haddonfield VIII (R); Lakehurst VII, VIII (Ds); Browns Mills VI, 15, VII, 5, IX, 15 (Dke); Cape May (Sk).
- L. cyanea* Fab. Ft. Lee VI (Bt); So. Orange IV, 18, Ocean Co. VII, 3 (Sm); Staten Island VI-VIII (Ds); Jamesburg VI, VII (div); Haddonfield VIII (R); Westville VII (div); Kirkwood VI, 16, Tuckahoe VII, 22, Seaville VII, 12 (C); Manumuskin VI, 4 (Dke); Cape May V, 30 (Sk).
- L. axillena* Westw. Clementon VI, 4 (C).
 var. *vibrans* Fab. Staten Island VII, VIII (Ds); no. branch, Big Timber Creek VII, 29, Albion VI, 1 (C).
 var. *incesta* Hag. Highlands, southward through the Delaware Valley and pine barrens; but not along shore VII-IX.
- L. exusta* Say. Highlands, and southward through Delaware Valley and pine barrens; but not along shore IV, 20-VIII, 8.
- L. quadrimaculata* L. Lake Hopatcong VII (Rhoads); Arlington, Staten Island V, VI (Ds); Jamesburg VII, 4 (Dke); Atco VI, 18 (Jn).
- L. semifasciata* Burm. Ft. Lee VI (Bt), and Piedmont Plain southward throughout the State V-IX, often common along shore.
- L. pulchella* Dru. Throughout the State IV, 18-IX, 1, often common.

PLATHEMIS Hagen.

- P. trimaculata** De G. Highlands and southward throughout the State V-IX, often common.

ERYTHRODIPLAX Brauer.

- E. berenice** Dru. Bergen Hill (Hag); Staten Island V-VIII (Ds); along shore Sandy Hook to Cape May V-IX, often very common; the larva in salt water and the only one I have found in such places (Sm).

NANNOTHEMIS Brauer.

- N. bella** Uhler. Staten Island VI, VII, Toms River VIII (Ds); Clementon VI, 25, Albion VI, 1, Lucaston VI, 1, pruinose ♂, Berlin VII, 17, Seaville VII, 21 (C); Lucaston VIII, 10, DaCosta VII, Iona VI, 16 (Dke).

CELITHEMIS Hagen.

- C. ornata** Ramb. Lakehurst IX, Toms River VIII (Ds); Clementon VII, 22, IX, 6, Ocean View VII, 25, Indian Creek VIII, 24, Patcong Cr VIII, 24, West West Creek Pond VIII, 26 (C); Lucaston IX, 2, DaCosta VII, 2-20 (Dke).
- C. elisa** Hag. Bergen Hill (Hag); Staten Island VI-VIII (Ds), and southward throughout the State VI-IX; usually not common.
- C. fasciata** Kirby. Lucaston VI, 27-VIII, 11, DaCosta VII, 7 (Dke); Malaga VI, VII (div).
- C. eponina** Dru. Hopatcong VII (Rhoads); Staten Island V, VII (Ds); throughout the Delaware Valley, pine barrens and coastal strip VII-IX.

LEUCORHINIA Britt.

- L. intacta** Hagen. Normanock VII, Newfoundland VII, Staten Island V, VI (Ds); So. Orange IV, 18 (Coll); Ft. Lee VII, 4, Clementon VI, 28 (Dke); Albion VI, 1 (C).

SYMPETRUM Newm.

- S. rubicundulum** Say. Throughout the State V-IX, not common.
var. *assimilata* Uhler. Westville VIII, 27 (N).
- S. albifrons** Charp. Delair VIII, 18, Manumuskin IX, 15, Belleplain IX, 16 (Dke).
- S. obtrusum** Hagen. Staten Island VII (Ds); Bamber, Browns Mills, Manumuskin, Belleplain all IX, 1-16 (Dke).
- S. semicinctum** Say. Sparta VII, Staten Island VII, 15 (Ds); Shark River VII, 12 (Jn).
- S. vicinum** Hagen. Lake Hopatcong VII (Rhoads); Bergen Hill (Hag); Staten Island IX-XI (Ds); New Brunswick (Coll); Delaware Valley and pine barrens generally VII-X, but not from coastal strip or maritime.

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S. corruptum Hagen. Staten Island V, 27, VIII, 8, several miles west of Barnegat XI, 1 (Ds).

PERITHEMIS Hagen.

P. domitia Dru. Staten Island VI, VII (Ds); Delaware Valley and pine barrens VI-IX; not on coastal strip or from maritime.

ERYTHEMIS Hagen.

E. simpliciollis Say. (Mesothemis) Piedmont Plain and southward throughout the State VI-IX, often common; also Ft. Lee (Bt); So. Orange V, 27 (Coll).

PACHYDIPLAX Brauer.

P. longipennis Burm. Throughout the State except the Appalachian V, 23-IX, 5, not usually common.

Order THYSANOPTERA.

The insects of this order are commonly known as "Thrips" and often cause severe injury to growing plants. They are very small, very slender, somewhat fusiform, with very delicate narrow fringed wings, which are laid flat upon the back when at rest and are not even visible to the ordinary observer without a lens.

The mouth parts are made up of a number of slender lancets, only the points of which protrude beyond the mouth opening. With these they scrape the surface of the leaf or plant and exhaust the cell beneath, leaving a yellow or whitish spot. Onion leaves sometimes turn almost white under a severe attack, and "silver-tip" in grasses is often due to these insects. Cabbage leaves are sometimes completely devitalized, and growing tips of young trees may be crippled. Not all species are harmful, however, some of them occurring under such conditions as to make it almost certain that they are predatory. Yet as a whole this little order must be considered as injurious.

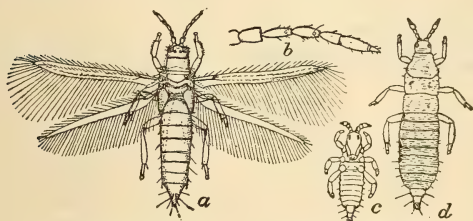


Fig. 28.—*Thrips tabaci*: *a*, adult; *b*, antenna of same; *c*, young larva; *d*, full-grown larva; enlarged.

As to remedial measures it is difficult to make recommendations. Ordinarily the species flourish only in dry weather, and their injuries increase and manifest themselves in a dry season, or after a protracted drought. A cold rain may check them when they threaten most, and a spray of cold water, thoroughly applied, is often suffi-

cient for their control. Tobacco decoction and soap suds are good additions, and may generally be relied upon to kill off the species in the greenhouse and garden.

Very little has been added to our knowledge of the New Jersey species since the previous edition, and the number of forms has not been increased by collections. Mr. Pergande is, therefore, still to be credited with the notes.

Family THRIPIDÆ.

COLEOTHRIPS Halid.

C. trifasciata Fitch. Infests grain and grasses.

CHIROTHRIPS Halid.

C. antennatus Osb. Infests grasses.

LIMOTHRIPS Halid.

L. cerialium Halid. Infests grain and grasses throughout the State.

HELIOTHRIPS Halid.

H. dracanæ Heeger. On hot-house plants.

H. hæmorrhoidalis Bouché. In green-houses, often common.

THRIPS Linn.

T. 6-maculatus Pergande. A general feeder on many plants.

T. tabaci Linden. On cabbages, onions and other vegetables throughout the State; a serious pest seasonally and locally (Sm).

T. tritici Fitch. On grain, grasses and flowers; also locally in tips of nursery peach trees, sometimes causing serious injury (Sm).

PHLÆOTHRIPS Halid.

P. caryæ Fitch. Occurs on hickory.

P. mali Fitch. Feeds on leaves of apple.

P. nigra Osb. Found commonly on clover.

P. phylloxeræ Riley. Occurs in galls of "Phylloxera," and is said to feed on its inhabitants.

Order PARASITICA.

Under this head come the sucking lice, which are parasitic on warm-blooded animals other than birds. They never become winged, have practically no transformations, the body is more or less flattened and either



Fig. 29.—Head-
louse, *Pediculus*
capitis; greatly
enlarged.

the feet are scansorial, fitted for climbing and holding, or the mouth hooks are so formed as to enable the insect to anchor itself firmly in place. The insects remain on their host constantly and the eggs are nearly always attached to the hair of the host animal.

Three species attack man and sometimes cause serious annoyance. In extreme cases an inflammatory condition of the skin may be set up to which the terms "phthiriasis" and "pediculosis" have been applied.

Almost all the domestic and many of the wild animals are subject to infestation and the list here given will undoubtedly prove incomplete when systematic collections are made.

Family PEDICULIDÆ.

PHTHIRIUS Leach.

- P. inguinalis** Leach. The "crab-louse": found in the arm-pits and pubic regions of man and sometimes on the coarse hair of the breast. The grasping structures of the feet are so well developed that it is easier to pull out a hair than to remove the parasite from it. Liberal and repeated applications of mercurial ointment are required to destroy these species.

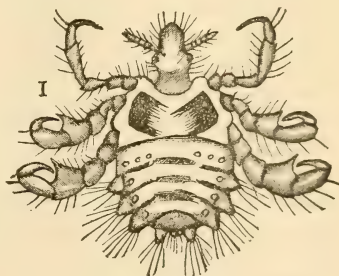


Fig. 30.—Crab-louse, *Phthirius*
inguinalis; greatly enlarged.

PEDICULUS Linn.

- P. capitis** DeG. The common "head-louse;" more generally found on children. A fine-tooth comb and repeated application of pomade or vaseline will readily control this pest. Tincture, or extract of Larkspur, has also been used with good effect.
- P. vestimenti** Leach. "Body-louse," "clothes-louse" or "gray-back." Lays its eggs in the seams of clothing in which also it hides when not actively feeding. Cleanliness is the best preventive; when an attack is to be dealt with, use mercurial ointment in the seams of the clothing or dip them in gasoline two or three times at intervals of one week. Steaming or thorough boiling will answer the same purpose.

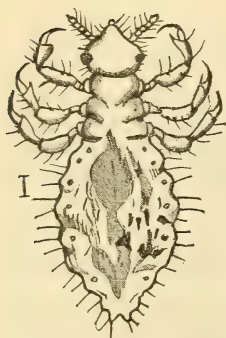


Fig. 31.—Body-louse,
Pediculus vestimenti;
greatly enlarged.

HÆMATOPINUS Leach.

- H. piliferus* Burm. The sucking-louse of the dog.
- H. pedalis* Osborn. Occurs on the feet of sheep below the wool and easy to destroy with any good sheep dip.
- H. eurysternus* Nitzsch. Short-nosed ox-louse. This and the following may be reached by the crude petroleum brushing recommended for the biting lice.
- H. vituli* Linn. Long-nosed ox-louse.
- H. urius* Nitzsch. The hog-louse: our largest species; sometimes very common and conspicuous.
- H. asini* Linn. Found on the horse and ass.
- H. spinulosus* Nitzsch. Found on the common rat.
- H. acanthopus* Burm. Infests field mice.
- H. ventricosus* Denny. Found on hares and rabbits.
- H. suturalis* Osborn. Infests chipmunks and ground squirrels.

Order HOMOPTERA.

This ordinal term is employed for those Rhynchota in which the two pairs of wings are either similar in texture, as in the plant-lice or "Cicada," or the primaries are of the same texture throughout, though this may be different from that of the secondaries, as in the leaf-hoppers.

The mouth parts are composed of four lancets, of which two are usually grown together concealed in a jointed beak, except in the Coccidæ or scale insects, in which the mouth parts are quite generally aborted in the males and reduced to thread-like lancets in the females. Usually the base of the beak is on the under side of the head, and its point is directed backward so that it rests between the haunches of the fore-legs.

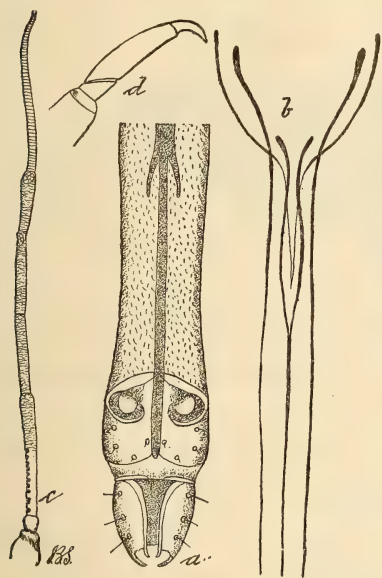


Fig. 32.—Mouth structure of a plant-lice: *a*, beak; *b*, the lancets; *c*, tarsus; greatly enlarged.

All the species are plant feeders, piercing the tissue by means of the lancets and exhausting the cells beneath. They are, therefore, of economic importance, and, as a matter of fact, some of our most destructive species belong to this order.

In a general way the transformations are incomplete; but the life histories of the species are often involved and sometimes curiously unique. No general recommendations for treatment can be given, except that only contact poisons are of any avail and stomach poisons are never indicated.

Since the previous list was published this order has received much attention from collectors and students, and the number of species here listed has been greatly increased. Most of the species previously included as probable inhabitants have been definitely authenticated and a few have been dropped for one reason or another.

By the courtesy of Mr. E. P. Van Duzee, of Buffalo, N. Y., the collections of certain of the groups made in New Jersey have been determined, and he has also been good enough to look over the manuscript in these groups and to give me suggestions as to the order of species and genera. A very few species remain that have not been actually taken in the State, but these are almost certain to occur, and besides these there are undoubtedly many new species yet to be discovered and determined by thorough collecting and study.

All of the gentlemen who assisted me ten years ago have continued their aid in one way or another.

Family CICADIDÆ.



Figg 33.—Egg punctures made by the Periodical Cicada, the twig broken at a.

Contains the largest species in this sub-order, popularly known as "harvest flies," and incorrectly as "locusts." They are found on shrubs and trees, the males making a shrilling sound during the day. This song or call is very loud and piercing, and is different for each species, so that each may be recognized by this character alone. In the adult stage they feed little or not at all, and are in no sense injurious except through their method of laying eggs in twigs and shoots, and even in this point only the "periodical cicada" offends.

The larvæ live underground and suck the juices of tree and other plant roots, but grow so slowly that they do no appreciable harm. Just how long our common species require for their complete life cycle is not definitely known; but the larva of the "periodical" species is known to live in that stage sixteen years in the north and thirteen years in the more southern States.

TETTIGEA Am. & Serv.

T. hieroglyphica Say. Occurs in June and July throughout the pine barrens, and is specifically reported from Lakewood, Lakehurst, Lahaway, DaCosta, Anglesea. It is the smallest of our species, the

abdomen is almost transparent, and I have noted it ovipositing in cedar.

TIBICEN Latr.

T. septendecim Linn. The "periodical cicada" or "17-year locust." Occurs at intervals throughout the State, appearing during the last days of May and continuing through most of June. There are two large broods in the State, a third that is fairly marked and two, if not three, that are dying out, and are represented at the present time by a few scattered examples only. The adults cause injury when they appear by their habit of cutting slits to deposit eggs in the terminal twigs of larger trees and in the trunks and branches of

nursery and other young fruit trees. These slits never heal, and, while on a large tree the injury is a mere trimming as the twigs wilt and break, on the small trees they are a source of permanent weakness, and sooner or later the branch or even trunk breaks.

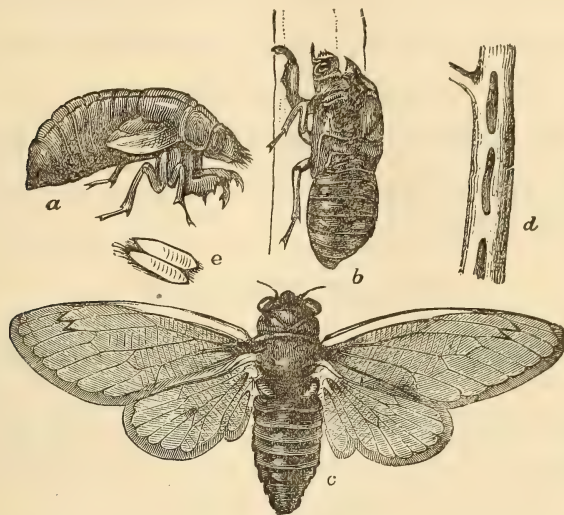


Fig 34.—The Periodical Cicada, *Tibicen septendecim*: *a*, pupa, ready to emerge; *b*, pupa skin from which adult has emerged; *c*, adult; *d*, cavities to receive eggs; *e*, eggs, enlarged.

The species "rimosa Say" and "striatipes Hald.," listed in the last edition, are probably not of our fauna.

CICADA Linn.

- C. marginata** Say. Staten Island VII (Ds); New Brunswick, rare, Lakewood common (Sm); DaCosta, Riverton IX, 10 (div). The largest of our species and the longest winged. Not found every year, but no definite intervals have been noted.
- C. sayi** Grossb. Throughout the State from mid-July to early October, and the most common of our "Harvest flies." It is the species that has in the past been known as "pruinosa" because of the uniform white powdering of the underside.
- C. pruinosa** Say. Cape May IX, 20, Anglesea IX, 8 (Dke); Bayside X, 21 (Coll). Really a very rare species, of which only a few specimens are known in collections.
- C. linnei** Grossb. Throughout the State, common from mid-July until frost. This is the species that used to be called "tibicen Linn." the latter being really a South American form.

- C. lyricen** DeG. Taken only at points north of New Brunswick, but probably occurs throughout the State with the preceding, which it closely resembles.
- C. canicularis** Harr. Throughout the State; more or less common. Occurs with "linnei," than which it is smaller, but otherwise nearly allied.
- C. davisii** Grossb. Paterson IX, 4 (Gr); Anglesea VIII, 25 (Coll).

CARINETA Am. & Serv.

- C. parvula** Say. Occurs all along the Atlantic Coast, and, according to Ashmead, should reach New Jersey. It is certain that a form not yet taken has been heard at Anglesea by myself and others, and it is probably this species.

Family MEMBRACIDÆ.

Contains the "tree-hoppers" which are odd-looking creatures, more or less wedge or beech-nut shaped, the prothorax often abnormally developed into horns, spines or crests. They leap and fly readily and are commonly found on trees and shrubs. The eggs are usually laid in slits made in twigs, shoots or other vegetable tissue, and many of the larvæ or nymphs envelop themselves in frothy masses. A few of them excrete honey dew.

Few of the species are really abundant and none of them cause injury by feeding. The "buffalo tree-hopper" and its allies do some harm by their egg-laying. The slits are made in the soft tissue of the twigs and shoots of fruit trees, and these wounds seem to be poisonous. At all events, instead of healing, the slits form open wounds which enlarge, check growth, make weak points where breaks occur when fruit is borne, or any strain is put upon the injured wood.

The punctures are readily noticed in winter and should be cut out when pruning and the cuttings destroyed. Insecticides are not indicated.

Sub-family SMILIINÆ.

CERESA Am. & Serv.

- C. diceros** Say. Throughout the State VI, VII, VIII, IX.
- C. bubalus** Fab. Common, VI-IX, throughout the State. This is the "buffalo tree-hopper" whose injuries are referred to above.
- C. brevitylus** Van D. Jamesburg VI, 19, New Brunswick VIII, 31 (Coll). Described from the New Jersey material.
- C. taurina** Fitch. Jamesburg VIII, 31, Staten Island V, VII, VIII, IX (Ds); Merchantville, Atco VI, 21 (Ss).
- C. borealis** Fairm. Chester VIII (Coll).
- C. basalis** Wlk. Chester IX, 1 (Coll), and probably throughout the Highlands.

The "C. brevicornis Fitch" is omitted because it has not yet been actually taken, although its occurrence is probable.

STICTOCEPHALA Stal.

- S. inermis* Fab. Not actually taken, but sure to occur in the State.
S. substriata Wlk. "New Jersey" (Van Duzee).
S. festina Say. Anglesea V, 28 (Sm).
S. lutea Wlk. Woodbury VI, 23 (Ss); Madison (Pr); Atco VI, 4, Jamesburg V, 3, VI, 9 (Coll).

ACUTALIS Fairm.

- A. tartarea* Say. Chester VII, 20, VIII, 24, Jamesburg VII (Coll); Staten Island VIII, 7, IX, 11 (Ds).

The species "semicrema" Say, "dorsalis" Fitch, and "calva" Say, are omitted because not yet actually taken; but they almost surely occur in the State. Dorsalis and calva belong to "Micrutalis" according to Van Duzee.

CARYNOTA Fitch.

- C. mera* Say. Chester VII, 4, 20 (Coll); Orange Mts. VII, 5 (Jn); Madison VIII, 6 (Pr); Merchantville VI, 29 (Ss); Lakehurst VII, 7 (Gr); Navesink Highlands VIII, 15 (Ds).
C. marmorata Say. Chester VII, 4 (Coll); Westfield VII, 9, Staten Island VII, 15, on alder (Ds).

THELIA Am. & Serv.

- T. bimaculata* Fab. Common on locust. Chester (Coll); Madison VIII, 12 (Pr); Morris Plains (Jn); Caldwell (Cr); Staten Island VII, 20, VIII, 2 (Ds); Rahway (Bf).

GLOSSONOTUS Butler.

- G. acuminatus* Fab. Lakehurst VI, VII, 19 (Ds).
G. turriculatus Emmons. Staten Island, Lakehurst VI (Ds); "New Jersey" (Goding).
G. univittatus Harr. Madison (Pr); Lakehurst VI, VII (div).
G. cratægi Fitch. "New Jersey" (Ss); Sparta VII, Staten Island VIII (Ds).

The species here listed appeared as "Thelia" in the last edition, and the species there referred to as "pyramidoides" Gdg., is = to "cratægi."

HELIRIA Stal.

- H. cristata* Fairm. Lakehurst VI, IX, on oak (Ds).
H. scalaris Fairm. So widely distributed that it must occur in the State, on beech.

TELAMONA Fitch.

- T. declivata* Van D. Sparta VII, Lakehurst VI, IX, on oak (Ds); one of the type localities.

- T. reclivata* Fitch. Hewitt VI, Staten Island VII, Navesink Highlands VIII, 15, Staten Island VII (Ds).
T. monticola Fab. Princeton VI, 11, Lahaway VII, 12 (Coll).
T. ampelopsidis Harr. Hewitt VII, Staten Island VII, VIII (Ds); New Brunswick IX, 13, Ocean Co. VIII, Hammonton, Lakewood (Coll).
T. coryli Fitch. Westfield (Ds).
T. concava Fitch. Anglesea VII, 8 (Ss).
T. unicolor Fitch. Staten Island VII, 8 (Ds).
T. extrema Ball. Staten Island VI (Ds); Lakehurst VI, VII, IX (div).
T. irrorata Godg. Madison VIII, 15 (Pr) = "inornata" of the previous list and probably an erroneous determination.

ARCHASIA Stal.

- A. galeata* Fab. Madison (Pr); Plainfield VII, 4 (Gr); Lakehurst on white oaks VI, VII (Ds); Milltown (Bf).
A. belfragei Gdg. Staten Island VII, Jamesburg VII (Ds); Browns Mills Jn VI, 21 (GG).

SMILIA Germ.

- S. camelus* Fab. Madison (Pr); Newfoundland, Oak Ridge VII, Staten Island VI (Ds); Lakehurst VII, 4 (Coll).

CYRTOLOBUS Goding.

- C. fenestratus* Fitch. Staten Island VII, 15 (Ds).
C. ovatus Van D. Staten Island, Lakehurst (Ds). Described from the New Jersey material.
C. muticus Fabr. Staten Island (Ds); Lakehurst VII, 5 (Coll).
C. sculptus Fairm. Madison VI, 12, 22 (Pr); Staten Island VI, VII (Ds); Lakehurst VII (div).
C. discoidalis Emmons. (*Atymna*) Sparta (Ds); Chester VII, 4, Madison VI, 22 (Coll); Berkeley Hts. (Bf).
C. vau Say. Milltown (Bf); Jamesburg V, 31, Anglesea VII, 4, 17 (Coll); Lakehurst VII, 17 (Ds).
C. inermis Emmons. Milltown (Bf); Lakehurst VI, 16 (Ds).
C. cinereus Emmons. Madison VIII (Pr); Lakehurst (Bf).
C. fuscipennis Van D. Staten Island, Jamesburg (Ds); part of the type material.
C. varius Gdg. Newfoundland VII, 5, Great Notch V, 30, Jamesburg VII, 2 (Ds); Lakehurst VI, VII (div). Mr. Van Duzee says this is the male of "vau."

ATYMNA Stal.

- A. castanea* Fitch. Throughout the highlands on chestnut V-VII (div); Jamesburg VII, 2, Staten Island VI, VII (Ds); Lakehurst VII, 7 (Coll).

- A. inornata* Say. Chester VII, 5, Jamesburg VI, 24 (Coll); Merchantville (Ss); Lakehurst VII (div).

"Quercci" Fitch has not yet occurred in the State.

XANTHOLOBUS Van D.

- X. nitidus* Van D. Lakehurst VII, 7 (Coll); Staten Island VII, 15 (Ds). Types from these localities.

OPHIDERMA Fairm.

- O. salamandra* Fairm. Newfoundland VII, Staten Island VI, 22, Lakehurst VI, 20 (Ds).
O. flavicephala Gdg. Lakehurst VII (Bf, Coll); Malaga VIII, 4 (GG).
O. flava Gdg. Staten Island VI, 22 (Coll).
O. pubescens Emm. Chester VII, 4, Lakehurst VII, 7 (Coll).
 "O. nigrocephala" of the previous edition is the same as "Atymna castanea."

VAN DUZEA Goding.

- V. arquata* Say. Madison VIII, 6, 30 (Pr); Staten Island VII, 8 (Ds); on locust.

ENTYLIA Germ.

- E. sinuata* Fab. Staten Island VI, IX, on "Iva frutescens," Perth Amboy V, Jamesburg VIII (Ds); Merchantville IV, 22, Camden XII, hibernating (Ss); Vineland (U S Ag); Jamesburg V, 10, Lahaway V, 20 (Coll).
E. bactriana Germ. Berkeley Hts. (Bf); Camden V, 18 (Ss).

PUBLILIA Stal.

- P. concava* Say. Madison VI (Pr); said to be common and widely distributed in the U. S. "Nigrodorsum" is a variation only.
P. reticulata Van D. Staten Island IX, 26 (Ds); Jamesburg VI, 24 (Coll). One of the types is the Jamesburg specimen.

Sub-family HOPLOPHORINÆ.

PLATYCOTIS Stal.

- P. 4-vittata* Say. Caldwell (Cr). Sagittata Germ., has not yet occurred to collectors.

Sub-family MEMBRACINÆ.

CAMPYLENCHIA Stal.

- C. curvata* Fab. Common throughout the State VI-VIII.

ENCHENOPE Am. & Serv.

- E. binotata* Say. Throughout the State, VI-VII. Mr. Davis records it on locust.

Sub-family CENTRODINÆ.

MICROCENTRUS Stal.

M. caryæ Fitch. Madison VIII, 11 (Pr); "New Jersey" (Ss).

CENTRUCHOIDES Fowler.

C. perdita Am. & Serv. Singac IX, Staten Island XI (Ds); Lakehurst VII, IX, X (div).

Family FULGORIDÆ.

The "lantern-fly" family is represented by monstrous and bizarre forms in tropical countries, but in New Jersey by insignificant, though often odd forms. There is no real typical form in our species, some having head or thoracic processes, while most have none at all. Some have broad wings laid roof-like along the sides, others have them narrow and almost flat over the abdomen. A few are covered by a floury or pruinose coating, and some resemble the tree or leaf-hoppers.

None of those occurring in the State are in the least harmful, while most of them may be accounted fairly rare. Mr. Van Duzee has been good enough to give me the sequence of genera here, and has added a number of interesting records.

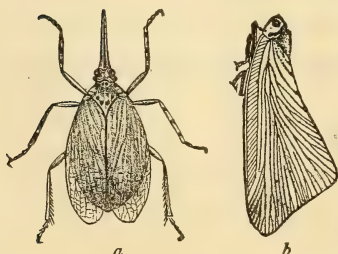
Sub-family DICTYOPHARINÆ.

DICTYOPHARA Germ.

D. lingula Van D. Staten Island VIII, 17 (Ds); Anglesea VII, 20, IX, 6 (Sm); Wildwood (Jn); Cape May VIII (Van D). This is the form noted as "sp. nov." in the last edition.

D. microrhina Wlk. Staten Island, salt marsh, VIII, 4, 28 (Ds); Woodbine VIII, 20, Cape May VIII, 19 (Van D).

SCOLOPS Schaum.



Fulgoridæ, or lantern-flies.—*a*, *Scolops sulcipes*; *b*, *Pæcilopectera truncaticornis*; twice natural size.

Fig. 35

S. sulcipes Say. Madison (Pr); Orange Mts. VIII, 29 (Coll); Westville (Jn); Ocean Co. (Sm); probably throughout the State.

S. dessicatus Uhl. Chester IX, 5 (Coll); Jamesburg VIII, 31, Lakehurst VIII, 18 (Ds); Riverton VIII, 17 (Van D).

S. angustatus Uhl. Riverton IX, 4 (Jn).

S. perdix Uhl. Staten Island VIII, 2 (Ds); Riverton VIII, 17 (Van D).

S. grossus Uhl. Westville VIII, 18 (Jn).

PHYLLOSCELIS Germ.

- P. atra** Germ. Madison (Pr); Farmingdale VIII, 12, Lakehurst IX, 6 (Ds); Riverton VIII, 17, Woodbine VIII, 21 (Van D).
 var. **albovenosa** Milichar. Riverton VIII, 17 (Van D)
- P. pallescens** Germ. Lahaway, on cranberry bogs, V (Sm); "N. J.," common (Van D).

Sub-family **ACHILINÆ.****ELIDIPTERA Spin. (HELIPTERA.)**

- E. pallida** Say. New Jersey, probably.
- E. septentrionalis** Prov. Manasquan IX, 23, Lakehurst IX, 24 (Ds); Lahaway IX, 14 (Coll).
- E. opaca** Say. "New Jersey" (Uhler).
- E. floridæ** Wlk. Lakehurst V, 29 (Ds); Riverton IV, 26, Pemberton V (GG).
- E. variegata** Van D. Riverton IX, 7 (GG).

CATONIA Uhler.

- C. nava** Say. Throughout the eastern United States.
- C. impunctata** Fitch. Cranford VIII, 27, Highlands of Navesink VIII, 15 Jamesburg VIII, 31 (Ds).
- C. picta** Van D. Type locality is Lakehurst VIII, 18 (Gr) X (Ds).
- C. cinctifrons** Fitch. New York and probably New Jersey.

Sub-family **CIXIINÆ.****BOTHRIOCERA Burm.**

- B. bicornis** Fab. "New Jersey" (Uhler).

OLIARUS Stal.

- O. quinquelineata** Say. Staten Island V, 22, VIII, 8, Jamesburg VII, 2 (Ds); Barnegat Bay Dist. VIII, 3 (Coll); Lakehurst VII, 7, 24, IX, 4 (div); Browns Mills Jn., VI, 21 (GG); Cape May (Van D).
- O. humilis** Say. Chester VIII, 12, Monmouth Co., on salt meadow VII, 31 (Coll); Madison VIII, 18 (Pr).
- O. completus** Ball. Chester VII, 24 (Coll); Staten Island VI, 17, VII, 1. Jamesburg VII, 5 (Ds).

CIXIUS Latr.

- C. stigmatus** Say. Chester VIII, 12 (Coll); Madison VIII, 6 (Pr); "New Jersey" (Jn).

The species "colæpeum" Fitch, "pini" Fitch and "vicarius" Wlk. are all so distributed that their occurrence in New Jersey is more than probable.

but as they have not been actually taken in the rather thorough collecting in this group it is deemed best to omit them from the record. "Albicincta" Germ. is probably not found in America at all.

OECLEUS Stal.

O. decens Stal. Clementon V, 30 (GG); Anglesea V, 28 (Sm).

MYNDUS Stal.

M. sordidipennis Van D. Staten Island VII, 1 (Ds).

M. viridis Ball. Monmouth Co., salt meadows, VII, 3 (Coll).

Sub-family ISSINÆ.

BRUCHOMORPHA Newn.

B. oculata Newn. Chester IX, 9, Lakehurst VII, 7 (Coll).

B. tristis Stal. Jamesburg VI, 22 (Ds) VII, 18 (Coll).

B. dorsata Fitch. Riverton (Jn).

NASO Fitch.

N. robertsonii Fitch. Occurs both north and south of the State.

APHELONEMA Uhler.

A. simplex Uhler. Monmouth Co., salt marsh VII, 31 (Coll); Cape May VIII, 19 (Van D).

THIONEA Stal.

T. simplex Wlk. Woodbury VII, 29 (Ss).

T. bullata Say. Should be taken in New Jersey (Van D).

Sub-family ACANALONINÆ.

AMPHISCEPA Germ.

A. bivittata Say. Madison (Pr); Little Falls VIII, Staten Island VII-IX, Farmingdale VIII, Lakehurst IX (Ds); Monmouth Co. VII, 31 (Coll). A pink form is not uncommon.

Sub-family FLATINÆ.

ORMENIS Stal.

O. pruinosa Say. More or less common throughout the State, VIII & IX, and on a great variety of trees and plants.

O. septentrionalis Spin. With the preceding; hardly less common, V-IX.

Sub-family DERBINÆ.

LAMENIA Stal.

- L. vulgaris* Fitch. Recorded from Chester to Lakehurst in all faunal regions VI-IX, inclusive.
L. uhleri Ball. Jamesburg VIII, 31 (Ds); Riverton (Jn).

OTIOCERUS Kirby.

- O. amyotii* Fitch. Madison VIII, 30 (Pr).
O. degeerii Kirby. Madison VIII, 11 (Pr); Staten Island VII, 8, Manasquan IX, 23 (Ds); Lahaway VIII (Coll).
O. francilloni Kirby. Grantwood VII, 20 (Coll).
O. wolfii Kirby. Staten Island VIII, 16 (Ds).
 "Coquebertii" Kirby, "signoretii" Fitch and "stollii" Kirby will also be found I have no doubt.

Sub-family DELPHACINÆ.

STENOCRANUS Fieb.

- S. dorsalis* Fitch. Eastern U. S. generally; doubtless in New Jersey.
S. lautus Van D. Riverton (Jn); New York City (Van D).

MEGAMELANUS Ball.

- M. spartini* Osb. Staten Island is the type locality.

MEGAMELUS Fieb.

- M. marginatus* Van D. Staten Island VII, 8 (Ds); Barnegat Bay Dist. VIII, 3, Anglesea (Coll).

PISSONOTUS Van D.

- P. brunneus* Van D. New York City, and certainly New Jersey.
P. delicatus Van D. Riverton VII, 17 (Van D).

STOBÆRA Stal.

- S. tricarinata* Say. Ft. Lee Dist. X, 6 (Brb); New Brunswick VII, 20 (Sm); Riverton (Jn); Merchantville X, 29 (Ss).
S. concinna Stal. Monmouth Co., salt meadows VII, 31 (Coll).

LIBURNIA Stal.

- L. ornata* Stal. Staten Island X, 21 (Ds); Riverton (Jn).
L. detecta Van D. New York City and doubtless in New Jersey.
L. puella Van D. New Jersey (Van D); Riverton (Jn).

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- L. foveata* Van D. Newark IX, 1 on salt marsh (Coll); Anglesea VIII, 23, Cape May VIII, 19 (Van D).
L. osborni Van D. "New Jersey" V (Sm); Barnegat Bay Dist. VIII, 3 (Coll).
L. pellucida Fab. Will yet be discovered in New Jersey no doubt.

PENTAGRAMMA Van D.

- P. vittatifrons* Uhl. "New Jersey" (Uhl); Staten Island VIII, 23, on salt meadow (Ds).

Family CERCOPIDÆ.

These are the "frog-hoppers" or "spittle-insects," so called because of the shape of the adults, which is broad and squat, the leaping power being also well developed, and because the larvæ live in little masses of white froth resembling spittle. In this group the thorax is without abnormal processes and is not produced back over the abdomen.

While "frog-spittle" is not uncommon on low meadows, shrubs and bogs, none of the species are injurious to cultivated plants in New Jersey.

Sub-family CERCOPINÆ.

TOMASPIS Am. et Serv. = (MONECPHORA).

- T. bicincta* Say. Throughout the State VII, VIII, not rare. The variety "ignipecta Fitch" has been recorded from Madison VIII, 6.

Sub-family APHROPHORINÆ.

LEPYRONIA Am. et Serv.

- L. quadrangularis* Say. Warren Co. VIII, 13 (Coll); Ft. Lee (Bt); Staten Island VII-X (Ds); Riverton (Jn); Camden I, Collingswood III, sifting (Ss).
L. angulifera Uhler. Ocean County (Uhler).

APHROPHORA Germ.

- A. quadrinotata* Say. Newfoundland VII, Westfield VII, Staten Island VI-IX (Ds); Chester VII-IX, Orange Mts. VIII, Lakehurst VII (Coll); Shark River VI (Jn).
A. parallela Say. Throughout the State VI-IX on white and pitch pine, and probably infests other species; sometimes not rare.
A. saratogensis Fitch. Newfoundland VII, Staten Island VII, VIII, Jamesburg VII, Farmingdale VIII, Lakehurst VII (Ds); Malaga VIII, 4, Browns Mills VI, 21 (GG).
A. signoretti Fitch. New York, and probably also New Jersey.

PHILÆNUS Stal.

P. lineatus Linn. Said to occur throughout North America.

P. spumarius Linn. Also of general distribution.

CLASTOPTERA Germ.

C. proteus Fitch. Throughout the State in July.

var. *flava* Ball. Hopatcong VII, Jamesburg VII (Coll).

var. *vittata* Ball. Chester VII (Coll); Lakehurst VII (div).

var. *nigra* Ball. Jamesburg VI, 22, VII (Ds); Lakehurst VII (Coll).

C. xanthocephala Germ. New Brunswick VII, 20, Anglesea VII, 23 (Sm).

C. obtusa Say. Piedmont Plain and northward VII-X, not rare; Staten Island X (Ds); Jamesburg VII, VIII (div).

var. *achatina* Germ. Chester VII, 4, Jamesburg VII, 18 (Coll).

JASSOIDEA.

Under the general term "leaf-hoppers" are included a large number of active little species referred to the families Tettigoniellidæ, Bythoscopidæ and Jassidæ. They are more or less elongate, usually tapering posteriorly, the head short, generally blunt and more or less crescent shaped, the tip of the beak projecting between the front legs. The feelers are very short and bristle-like, the hind legs long and fitted for leaping. They occur on grasses, shrubs and trees of all kinds and many of them are injurious, sometimes much more so than is generally appreciated. On grape one

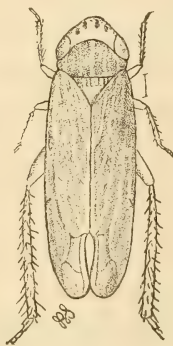


Fig. 36.—*Athysanus vaccini*. Fig. 37.—*Thamnotetix fitchii*. Fig. 38.—*Agallia 4-punctata*.

species occurs that often becomes excessively abundant after mid-summer, punctures the cells of the leaves and produces a yellow spot which afterward turns brown. When these spots are sufficiently close together the entire leaf dries up, dies and drops long before the shoot is mature. Young apple trees frequently suffer from an allied species that yellows and dries the foliage soon after mid-summer.

In general, the insects winter as adults in rubbish and crevices and lay

eggs in spring, many of the species developing several generations during the season. The adults are attracted to light, and many thousands are sometimes found in the globes of electric lamps near cities and towns; but we have not found it practical to prevent injury by thus trapping them.

Remedial measures are, in general, cleaning up the rubbish in which they hibernate, capturing them on sticky surfaces, and spraying with some contact insecticide. The first method needs no explanation. Capturing on sticky surfaces is much resorted to in vineyards, sometimes merely with palm-leaf fans coated with tar or "tanglefoot," sometimes with elaborate screens run between the rows, the vines being jarred to induce the insects to jump or fly. Persistently employed this method destroys immense numbers, and if begun early in the season will secure practical exemption in fall.

Spraying is with either kerosene emulsion or fish oil soaps. The mixture should always be made as strong as the foliage will stand, the spray should be very fine and should be applied with as much force as possible so as to reach the partly-grown insects which tend to crouch close to surface among the plant hairs; and it is also desirable to keep the air about the vines or plants filled with the fine mist so as to reach the adults that tend to fly at the first disturbance. In general the toll exacted by these leaf-hoppers is not appreciated by the agriculturist.

Family TETTIGONIELLIDÆ.

Sub-family TETTIGONIELLINÆ.

ONCOMETOPIA Stal.

O. undata Fab. Riverton VII, 31 (Jn); Anglesea VI, 30 (Ss).

O. costalis Fab. G. d., throughout the U. S. east of the Rocky Mts.

AULACIZES Am. et Serv.

A. irrorata Fab. Palisades VIII, Staten Island X, Navesink Highlands VIII (Ds); Jamesburg IX, 30 (Brb); Woodbury VI, 4 (Ss); Anglesea V, 30 (Coll).

A. guttata Uhl. New York to Florida and sure to occur in New Jersey.

KOLLA Dist.

K. bifida Say. Madison (Pr); Palisades VIII, 21, Staten Island VIII, 7 (Ds); Jamesburg X, 2 (Coll); Riverton IX, 11 (Jn).

TETTIGONIELLA Jacoby.

T. tripunctata Fitch. Staten Island IX, 7 (Ds).

T. gothica Sign. Staten Island VIII, 26, Jamesburg V, 25 (Ds); Lakehurst VII, 7 (Coll). "*T. hieroglyphica* Say" does not seem to occur east of Illinois.

DIEDROCEPHALA Spin.

D. coccinea Forst. More or less common throughout the State, VI-X.

DRÆCULACEPHALA Ball.

- D. mollipes* Say. Throughout the State, common, all season.
D. angulifera Wlk. Sure to be found in New Jersey.
D. noveboracensis Fitch. "Doubtless common in grassy lowlands in New Jersey."

HELOCHARA Fitch.

- H. communis* Fitch. Caldwell (Cr); Staten Island X, "New Jersey" III (Ds).

Sub-family GYPONINÆ.

XEROPHLCÆA Germ.

- X. viridis* Fab. (*peltata* Uhl.) \ Arlington (Coll); Jamesburg VIII, 31 (Ds).
X. major Bak. Ft. Lee dist. X, 12, Jamesburg VII, 4 (Brb).

GYPONA Germ.

- G. cana* Burm. More or less common throughout the State, VII-X. This name Mr. Van Duzee refers to the commonest large species in the State and cites "*quebecensis* Prov.," as a probable synonym. Some of the references under "*octo-lineata*" in the last edition belong here.
G. octolineata Say. This name is now confined to the large form with scarlet marks. Mr. Grossbeck has taken a pink form of this.
G. striata Burm. (*flavilineata* Fitch.) Also occurs throughout the State and probably confused with "*cana*." Our records range from Chester to Lakehurst, and from VI to X.
G. melanota Spang. Madison VII, VIII (Pr); Staten Island VIII (Ds); "New Jersey" (Van D).
G. bimaculata Woodw. Del. Water Gap (Ss); Staten Island VIII, X (Ds).
G. scarlatina Fitch. Jamesburg VI-VIII (Ds); Merchantville X, 15 (Ss); Lakehurst VII (div).
G. olivacea Spang., not *rugosa* Spang. Clifton VIII, 24 (GG); Navesink Highlands VIII, 15, Lakehurst IX, 6-X, 6 (Ds); Riverton (Jn).
G. albosignata Uhl. Coastal plain of United States (Uhler).

PENTHIMA Germ.

- P. americana* Fitch. Del. Water Gap VII, 12 (Coll); Greenwood Lake V, 18 (Brb); Madison VI, 27 (Pr); Jamesburg V, 10 (Sm); Lakehurst V-VII (div); Atco VI, 18 (Jn); Anglesea (Ss).

Family BYTHOSCOPIDÆ.

BYTHOSCOPIUS Germ.

- B. variabilis* Fitch. Newfoundland VII, 4, Singac VI, 15, Staten Island VI, VII, Lakehurst VI, 30 (Ds).
- B. sobrius* Wlk. Found in New York and probably in New Jersey.
- B. cognatus* Van D. Occurs with the preceding.
- B. fenestratus* Fitch. Singac VI, 15, (Ds).
- B. pruni* Prov. Singac VI, 15 (Ds).
- B. minor* Fitch. Staten Island VI, 18 (Ds).
- B. nigrinasi* Fitch. Sure to occur in New Jersey.
- B. distinctus* Van D. New York to North Carolina, and surely in New Jersey.
- B. fagi* Fitch. Will probably be found in northern New Jersey.

PEDIOPSIS Burm.

- P. insignis* Van D. Newfoundland VII, 4 (Ds).
- P. viridis* Fitch. Riverton IX, 25 (Jn).
- P. trimaculata* Fitch. Sure to occur in New Jersey.
- P. sordida* Van D. Staten Island (Ds).

IDIOCERUS Lewis.

- I. pallidus* Fitch. Staten Island VI, 22 (Ds).
- I. suturalis* Fitch. Sure to occur in New Jersey.
- I. nervatus* Van D. "New Jersey" (Van D).
- I. lachrymalis* Fitch. Lakehurst VII, 7 (Coll).
- I. alternatus* Fitch. Occurs throughout the eastern United States.
- I. cratægi* Van D. On thorn, New York to Iowa.
- I. maculipennis* Fitch. Sure to occur in New Jersey.
- I. provancheri* Van D. New York to Iowa.

AGALLIA Curtis.

- A. 4-punctata* Prov. Throughout the State, V-VIII, more or less common; sometimes abundant on cranberry bogs, but probably feeding on weeds, etc., rather than on vines.
- A. sanguinolenta* Prov. Newark, Jamesburg VII, 5, Merchantville X, 29, Lakehurst VII, 7, Anglesea VII (Coll).
- A. constricta* Van D. Madison VI, 1 (Pr); New Brunswick VII, 20, Ocean Co. V, Lahaway VII, 10, Anglesea (Coll).
- A. novella* Say. Riverton (Jn).

Family JASSIDÆ.

Sub-family ACOCEPHALINÆ.

ACOCEPHALUS Germ.

- A. albifrons* Linn. (*mixtus* Say.) Staten Island VI, VII (Ds); New Brunswick VII, 20 (Sm); Lakehurst VII, 7 (Coll).
A. brunneo-bifasciatus Geoff. New Jersey (Ball).

XESTOCEPHALUS Van D.

- X. pulicarius* Van D. New York and probably New Jersey.

Sub-family JASSINÆ.

Dorydini.

HECALUS Stal.

- H. lineatus* Uhl. Shark River VII, 9 (Jn); New Jersey (Van D).

SPANGBERGIELLA Sign.

- S. vulnerata* Uhl. New Jersey (Sm).

PARABOLOCRATUS Fieb.

- P. viridis* Uhl. Jamesburg V, 31 (Coll).

Dectocephalini.

MESAMIA Ball (PARAMESUS Van D.)

- M. nigridorsum* Ball. Staten Island IX, 11 (Ds).
M. vitellina Fitch. Madison VI, 30 (Pr); New Brunswick (Sm).
M. cincta O & B. Manasquan IX, 23 (Ds); is the "jucundus" of the previous list.

PLATYMETOPIUS Burm.

- P. acutus* Say. Chester VII, 3, Jamesburg X, 2, Lakehurst VII, 4, Anglesea VII, 12 (Coll); Staten Island VI, VIII, X (Ds).
P. frontalis Van D. Chester VII-IX, Jamesburg X, 2, Lakehurst VII, 7 (Coll); Madison VI (div); Cranford VII, 27, Staten Island VI, 22 (Ds).

DELTOCEPHALUS Burm.

- D. sayi* Fitch. Madison VI, 14 (Brb); Riverton VI, 25 (Coll); Clementon (Jn).
D. inimicus Say. Chester IX, 10, Jamesburg VII, 15 (Coll); Camden IX, 27 (Ss).

- D. nigrifrons* Forbes. Camden IX, 27 (Ss).
D. simplex Van D. Barnegat Bay Dist. VIII, 3 (Coll).
D. littoralis Ball. Barnegat Bay Dist. VII, 3 (Coll); Anglesea VIII, 23, Cape May VIII, 17 (Van D); on salt marshes.
D. obtectus O & B. Chester IX, 7 (Coll); Riverton IX, 11 (Jn).
D. areolatus Ball. Woodbine VIII, 21 (Van D).
D. flavicosta Stal. Chester IX, 7 (Coll); Riverton VIII, 17 (Van D); this is probably the species listed as "retroversus Uhl.," in the last edition.
D. affinis Baker. Monmouth Co., salt meadows, VII, 21, Anglesea VII, 12. (Coll).
"D. virgulatus Uhler," is "*Athysanus bicolor* Van D."

GONIOGNATHUS Fieb.

- G. palmeri* Van D. Staten Island VI (Ds).

Athysanini.

ATHYSANUS Burm.

- A. striola* Fall. Anglesea V, 20 (Sm).
A. parallelus Van D. Lahaway VII, 21 (Coll).
A. exitiosus Uhl. (*Limotettix*) Newark, salt meadows IX, 1, Jamesburg VIII, 8 on cranberry bogs (Coll); Riverton IX, X (Jn).
A. extrusus Van D. Madison VI, 16 (Pr); Overbrook V, 30 (Ds).
A. anthracinus Van D. Staten Island VI, Jamesburg VII, 5 (Ds).
A. plutonius Uhl. Madison VI, 16 (Pr).
A. vaccini Van D. New Brunswick VII, 1 Jamesburg VII, Burlington Co. VIII, Anglesea V, 28; common on cranberry bogs, but apparently not injurious to the plants. This name replaces *A. striatulus* of the last edition.
A. curtisii Fitch. Budds Lake IX, 13, Chester IX, 9 (Coll); Roselle VI, 28 (Brb); Cranford VIII, 27, Staten Island VI, 17 (Ds).
A. bicolor Van D. (*virgulatus* Uhl.) "New Jersey" (Uhl).

EUTETTIX Van D.

- E. subænea* Van D. "New Jersey" (Ball).
 var. picta Van D. Lakehurst VII, 7 (Dn).
 var. tristis Ball. Lakehurst VII, X (div).
 var. marmorata Van D. Burlington Co. VIII, 19 (Sm).
 var. southwickii Van D. Newfoundland VII, 29 (Ds).
 var. lurida Van D. New York to Maryland.
E. johnsoni Van D. Chester VIII, 12 (Coll); Madison VI, 30 (Pr); Palisades IX, 22, Staten Island VII, VIII (Ds); Woodbine VIII, 21 (Van D).

E. seminuda Say. Sure to occur in New Jersey.

E. strobi Fitch. Jamesburg V, 25 (Ds).

PHLEPSIUS Fieb.

P. altus O & B. Woodbine VIII, 21 (Van D).

P. excultus Uhl. New York to Florida, and doubtless in New Jersey.

P. humidus Van D. "New Jersey" (Jn); Clifton VII, 3 (GG).

P. truncatus Van D. Philadelphia (Jn).

P. irroratus Say. Chester IX, 5, New Brunswick, Jamesburg X, 2, Lakehurst VII, 7, Anglesea V, 20 (Coll); Staten Island VII, 9 (Ds).

P. fuscipennis Van D. Newark IX, 1, Anglesea VI, VII, (Coll), on salt marshes.

P. latifrons Van D. Almost sure to occur in New Jersey.

P. fulvidorsum Fitch. Riverton IX, 11 (Jn); Burlington Co. VII (Sm).

P. uhleri Van D. Jamesburg VII, 2 (Ds).

P. majestus O & B. Anglesea (Ss).

P. decorus O & B. "New Jersey" (Jn).

ACINOPTERUS Van D.

A. acuminatus Van D. Riverton VIII, 17 (Van D); Lakehurst VII, 12, VIII, 23 (div).

SCAPHOIDEUS Uhl.

S. immistus Say. New Brunswick VII, 20, Jamesburg VIII, 16, Lakehurst VII, 4 (Coll); Staten Island VIII, 2, Farmingdale VIII, 11 (Ds).
var. *major* Osb. Lakehurst X, 18 (Ds).

S. intricatus Uhl. "New Jersey" (Uhl).

S. luteolus Van D. "New Jersey" (Van D).

S. lobatus Van D. Madison VIII, 6 (Pr); Staten Island VIII, 7 (Ds).

S. consors Uhl. Ranges from New York to Texas.

S. jucundus Uhl. Staten Island VIII, 4 (Ds); Lahaway VII, 20, Lakehurst VII, 7 (Coll).

S. auronitens Prov. "New Jersey" (Coll); Cranford VIII, 27 (Ds).

S. opalinus Osb. Riverton VIII, 17 (Van D).

S. fasciatus Osb. Riverton VIII, 17 (Van D).

S. sanctus Say. Riverton VIII, 17 (Van D).

THAMNOTETTIX Zett.

T. clitellaria Say. Throughout the State, common, V-X.

T. kennicotti Uhl. Madison VIII, 6 (Pr); Staten Island X, 3 (Ds).

T. fitchii Van D. Lahaway, Burlington Co., on cranberry bogs.

- T. smithi** Van D. "New Jersey" (Van D).
T. melanogaster Prov. Have seen this from New Jersey (Van D).
T. subcupreus Prov. Anglesea VIII, 23, Cape May VIII, 21 (Van D).
T. perpunctata Van D. Wildwood (Jn, fide Van D).

"Eburata Van D," is omitted as probably boreal only. There are, on the other hand, probably undescribed species in the collections from the salt marshes at Newark and from Anglesea.

CHLOROTETTIX Van D.

- C. unicolor** Fitch. Madison VII, 25 (Pr); salt meadows, VIII, 23, Jamesburg VII, 15 (Coll); Staten Island VI-VIII (Ds).
C. viridia Van D. Cranford VIII, 27, Staten Island VIII, IX (Ds); Newark IX, 1, New Brunswick VII, 20, Jamesburg VII, 15, Anglesea VI (Coll); Riverton X, 9 (Jn).
C. tergata Fitch. Chester VIII, IX, Jamesburg, on cranberry bogs VIII, 8 (Coll); Cranford VIII, 27, Staten Island VII, VIII, Lakehurst IX, 12 (Ds).
C. galbanata Van D. New York to North Carolina, and doubtless in New Jersey. Mr. Baker claims that this is really "unicolor Fitch," but Mr. Van Duzee does not agree.
C. rugicollis Ball. Woodbine VIII, 21 (Van D).

Jassini.

JASSUS Fab.

- J. olitarius** Say. Throughout the State VII-X, common. The name "bifasciatus Say," of the last edition, refers to the female of this species.

NEOCÆLIDIA G & B.

- N. tumidifrons** G & B. Manasquan IX, 23, Lakehurst IX, 14 (Ds).

Cicadulini.

BALCLUTHA Kirk. (GNATHODUS Fieb.)

- B. punctatus** Thunb. Cranford VIII, 27 (Ds); Lahaway V (Coll).
B. impictus Van D. New Brunswick VII, 20, Lahaway VIII (Coll).

EUGNATHODUS Baker.

- E. abdominalis** Van D. New Brunswick VII, 20, Anglesea V, 20 (Coll).

CICADULA Zett.

- C. sexnotata** Fall. New Brunswick VII, 20, Monmouth Co., salt meadows VII, 31, Anglesea V, 21 (Coll); Woodbine VIII, 21, Anglesea VIII, 23 (Van D).

- C. variata* Fall. Staten Island VIII, 17 (Ds); Anglesea VIII, 23 (Van D).
C. punctifrons Fall., with its variety "repleta Fieb.," have not yet turned up, but will be found almost certainly.

Sub-family TYPHLOCYBINÆ.

ALEBRA Fieb.

- A. albostriella* Fall. Common throughout the eastern United States.

DICRANEURA Hardy.

- D. fieberi* Low. "New Jersey" (Gillette).

EMPOASCA Walsh.

- E. smaragdula* Fall. Common to the eastern United States.
E. fabæ Harr. The bean leaf-hopper; occurs throughout the United States.
E. mali LeB. The apple leaf-hopper; common and sometimes decidedly injurious throughout the State. Found on a great variety of plants other than apple, and very difficult to control.
E. obtusa Walsh. New Brunswick VI, 9, VII, 20 (Coll).

EUPTERYX Curtis.

- E. flavoscuta* Gill. Quite sure to occur in New Jersey.

TYPHLOCYBA Germ.

- T. tricineta* Fitch. Will certainly be found in the State.
T. comes Say. The grape leaf-hopper. Common and sometimes very injurious throughout the State, especially in the southern section. Sometimes, in September, the foliage is dead and dry from the attacks of this insect long before the fruit is mature. The varieties "vitis Harris" and "vitifex Fitch" occur with the type; the variety "basilaris Say" occurs at New Brunswick on elm.
T. vulnerata Fitch. United States generally; the variety "niger Gill.," has been taken at Chester, IX, 9 (Dn).
T. obliqua Say. Sure to occur in New Jersey.
T. querci Fitch. New Brunswick VII, 20 (Coll).
T. trifasciata Say. Riverton (Jn).
T. bifasciata G & B. New Brunswick VIII, 24 (Coll).
T. rosæ. Linn. The common rose leaf-hopper, which occurs abundantly throughout the State.

Family PSYLLIDÆ.

Commonly known as "jumping plant lice" from their active habits, but really resemble much more closely a miniature Cicada in appearance. Both pairs of wings are transparent as a rule and the antennæ are quite long, thus differing from the leaf and tree-hoppers to which in some other respects they are similar.

Some of the species produce galls, while others feed exposed on the foliage. Our only injurious species is the "pear psylla," which not only punctures the leaf and fruit stalk, exhausting the juices, but also excretes a honey dew in such great quantity as to coat the leaves and form a foundation for the development of a black fungus that covers both leaves and fruit and checks development. The insect hibernates as an adult in bark crevices and under bud scales, and a thorough spraying just before the buds open, with one of the miscible oils diluted no more



Fig. 39.—Pear psylla; winged adult; enlarged.



Fig. 40.—Appendiculate eggs of Psylla; much enlarged.

than nine times, will kill most of the specimens in their winter quarters. Summer applications are not nearly so effective, because the young are often covered by a frothy secretion and the adults fly readily to avoid the spray; but a strong kerosene emulsion is sometimes a great help in reducing numbers.

There has been little collecting in this family since the last edition was published and the present list stands now much as it did then, as Mr. Schwarz left it.

Sub-family LIVIINÆ.

LIVIA Latr.

- L. maculipennis* Fitch. Staten Island VI, 13, Jamesburg VII, 13 (Ds).
L. vernalis Fitch. Common throughout the eastern United States on *Juncus* sp.; imago in winter on pine trees.

Sub-family APHALARINÆ.

PSYLLOPSIS Loew.

- P. fraxinicola* Forst. Atlantic City on "*Fraxinus excelsior*" (C V. R).
 Imported from Europe and quite injurious to ash trees (Sz).

APHALARA Forst.

- A. calthea* Linn. New Brunswick VII, 27 (Sm), on "*Polygonum hydro-piper*" (Sz).
A. sp. nov. Sz. Anglesea V, 28 (Sm), on *Solidago* throughout the State (Sz).

Sub-family PSYLLINÆ.

CALŌPHYA Liv.

- C. nigripennis** Riley. Common on sumach, "*Rhus copalina*," throughout the State; Anglesea V, 28.
- C. flavida** Sz. Found only on the smooth-leaved sumac, "*Rhus glabra*"; also common.

PSYLLA Geoffr.

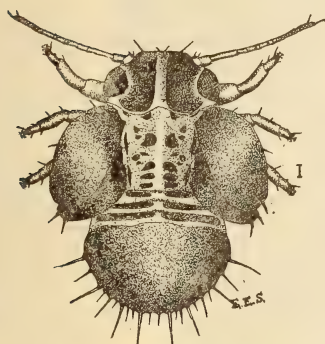


Fig. 41.—Pear psylla; pupa from above; much enlarged.



Fig. 42.—Pear psylla; pupa from below; much enlarged.

- P. annulata** Fitch. Sure to occur in New Jersey.
- P. carpina** Fitch. Common on *Carpinus* in New York, and probably in New Jersey.
- P. buxi** Linn. An imported species on "*Buxus sempervirens*," which has been found in Jersey City.
- P. pyricola** Forst. Throughout the State but more abundant in the southern counties. This is the "pear psylla," and its injuries are very local though sometimes severe.

PACHYPSYLLA Riley.

- P. celtidis-mamma** Riley. Makes leaf galls on "*Celtis*," in New Jersey (Bt).
- P. celtidis-cucurbita** Riley. Also a common gall-maker on "*Celtis*" (Bt).
- P. celtidis-vesiculum** Riley. Found with the preceding (Bt).
- P. venusta** O. S. Paterson III, 25 (Coll); makes galls on the leaf petioles of hackberry in New Jersey (Bt).
- P. celtidis-gemma** Riley. Locally common in New Jersey, making galls on the twigs of *Celtis*.

Sub-family TRIOZINÆ.

TRIOZA Forst.

- T. diospyri* Ashm. Anglesea V, 28 (Sm); common on persimmon everywhere (Sz).
T. tripunctata Fitch. Staten Island X, 31 (Ds); Anglesea V, 28 (Sm); common, the imago frequently met with in winter on pine trees (Sz).

Family APHIDIDÆ.

The "plant-lice," "green-flies" or "aphids" are among the commonest and most abundant of all our insects, and also among the most destructive. They have, when winged, two pairs of transparent wings, the anterior much the larger; but some species and some forms of nearly all species never develop wings at all. The bodies are plump, oval, with usually a pair of "honey tubes" or "cornicles" near the anal end, a pair of long antennæ and rather long sprawly legs. They frequently cluster in great numbers about twigs or shoots of plants or on the under surface of leaves, sucking the juices and excreting from the anal end a thin sugary liquid, the honey dew. This honey dew when present in quantity tends to choke the leaves upon which it falls, and that tendency is furthered by a black soot fungus which develops on the honey dew and disfigures and sometimes checks the growth of fruits as well as leaves.

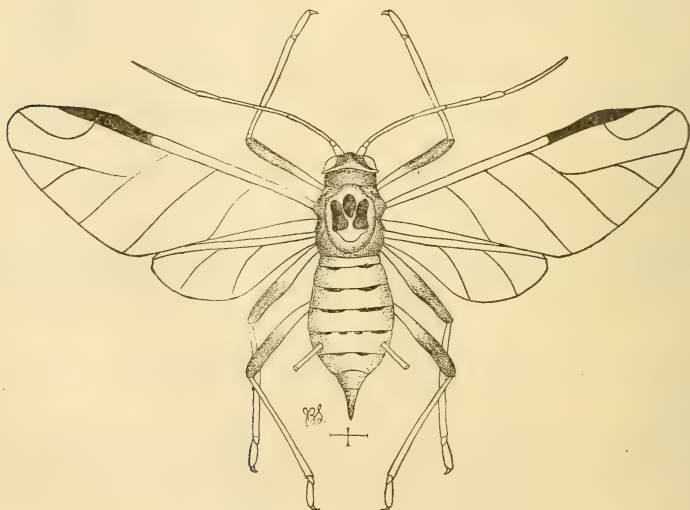


Fig. 43.—Wheat plant louse; much enlarged.

The life history of the species is interesting and sometimes complicated; but briefly stated is generally about as follows: They winter as

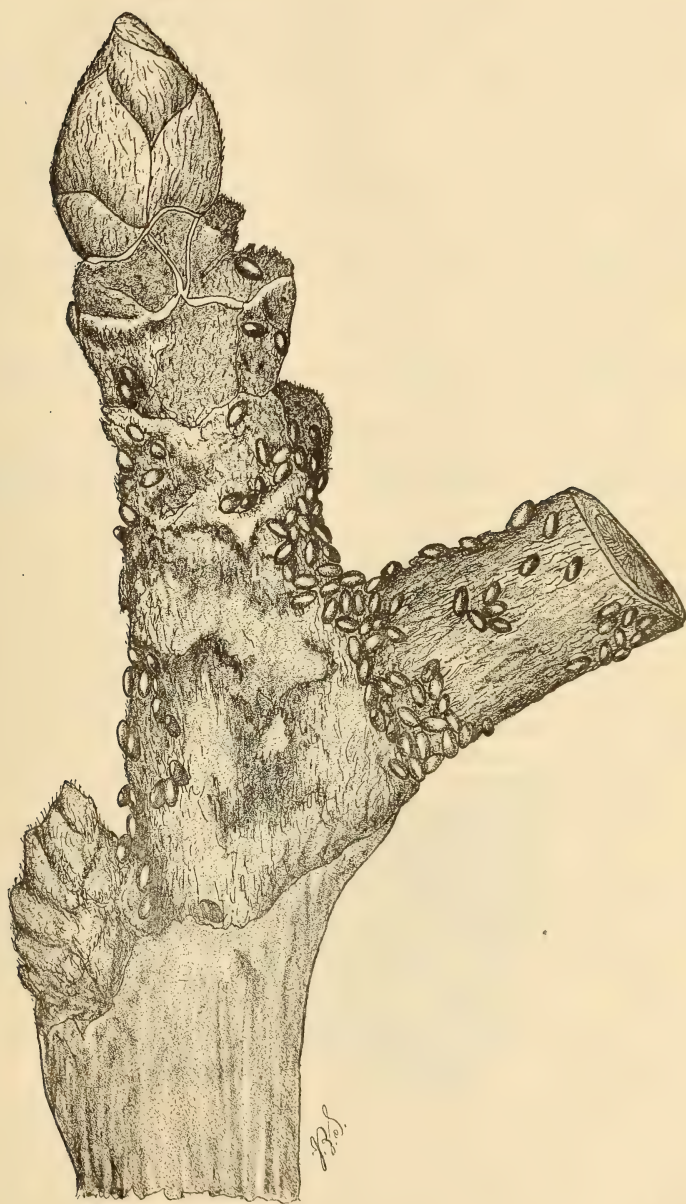


Fig. 44.—Eggs of apple plant louse; very much enlarged.

eggs, from which in spring hatch wingless forms which, in a few days, give birth to living young resembling the parents, and, like them, viviparous, i. e., giving birth to live young, and parthenogenetic, i. e., neither male nor female. These young are in turn ready to reproduce in a few days, and give birth to anywhere from 4 to 8 daily, according to conditions. Some time during the early summer winged individuals are produced and these fly to other localities or other food-plants, thus spreading the species. They also are parthenogenetic and usually viviparous, and found colonies wherever they alight, the progeny being winged or wingless or some of each sort. In the fall, when sap ceases to run and food becomes scarce, sexed individuals, male and female, are produced, and these copulate, the female laying the winter eggs. There are numerous modifications of this life history; but in a general way it applies to a large percentage of the species.

Some species have alternate food-plants; i. e., they feed upon one plant late in fall and early spring, using it to winter upon, while in summer they fly to some annual like the melon or hop that dies down completely in fall and renders migration to the winter plants necessary again in late summer or fall. The spring migrations usually occur in June and the air is then sometimes apparently alive with these minute flying lice.

The rate of increase among these insects is such that, were it not for the numerous natural checks, they would soon destroy every particle of plant life which they are able to feed upon.

Remedial measures are, winter pruning where eggs are noticed in large numbers, the cuttings to be burnt; application of contact insecticides early in the season to destroy the stem-mothers; application of contact insecticides at any time when the insects are noticed, keeping in mind at all times that it is easier to kill a few than to reach a great many, especially if they feed so as to distort the leaves or curl them up into shelters not easily penetrated by insecticides. Indoors the pyrethrum, dry or in the form of decoction, is a favorite and effective remedy. In the field, garden or greenhouse, tobacco decoction, whale-oil soap or kerosene emulsions are used. Soluble or miscible oils are not safe for summer use at effective strengths. Whale-oil soaps are used at from 1 pound to 4 to 6 gallons of water, according to the species to be reached. Kerosene emulsion is used diluted with from 10 to 15 times its bulk of water, the green lice being most easily destroyed in all cases and the black lice the most resistant.

Tobacco decoctions, home-made and commercial, are also used, and some of the commercial preparations are more effective than the home-made mixtures.

Whatever mixtures are used thoroughness in application is always essential. All these mentioned are contact poisons and of no effect unless actually brought into direct touch with the specimens. Therefore it requires not only a proper nozzle to make a fine spray, but also a sufficient amount of force to drive this spray to the specimens.

Under some circumstances even cold water will kill plant lice, and a cold storm in middle or late June will play havoc with the migrating

forms and may practically exempt an alternate food-plant for the season.

Little systematic collecting has been done in New Jersey in this family, and the list here follows Mr. W. D. Hunter's Catalogue of 1901 as published in Bull. 60 of the Iowa Agricultural College Experiment Station. It is probable that numerous additions will be made when our fauna has been more thoroughly studied.

Sub-family RHIZOBIINÆ.

All the members of this sub-family occur on the roots of plants.

TYCHEA Koch.

T. brevicornis Hart. Chester VIII, 5, on roots of lettuce (Marsh).

RHIZOBIUS Burm.

R. lactucæ Fitch. The common lettuce-root louse; found locally injurious.

Sub-family CHERMAPHINÆ.

PHYLLOXERA Fonsc.



Fig. 45.—Grape leaf infested by *Phylloxera*.

P. caryæ-caulis Fitch. Common; making galls on twigs and leaf stalks of hickory in New Jersey (Bt).

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P. caryæ-foliæ Fitch. Makes galls on leaves of hickory; common throughout the Watchung Mts.

P. caryæ-venæ Fitch. Forms pleats or galls along the veins or ribs of hickory leaves; sometimes locally common.

P. vastatrix Planch. The grape Phylloxera; occurs throughout the State, but nowhere in destructive form.

The other names occurring in the previous edition do not appear to be sanctioned by description, and are therefore omitted. It is certain, however, that there are several additional species in the State.

CHERMAPHIS Mask. (CHERMES.)

C. abieticolens Thos. Edgewood (U S Ag); found locally on spruce.

C. laricifoliæ Fitch. Common locally on American larch or tamarack.

C. pinicorticis Fitch. Jamesburg (Coll), and throughout the pine barrens; sometimes quite common.

Sub-family PEMPHIGINÆ.

TETRANEURA Hartig.

T. ulmi DeG. Under side of leaves of European and American elms.

HORMAPHIS O. S.

H. hamamelidis Fitch. Makes galls on leaves of witch hazel, N. J. (Bt).

H. spinosus Shimer. Makes gall on fruit buds of witch hazel, N. J. (Bt).

PEMPHIGUS Hartig.

P. acerifolii Riley. Found throughout the State on the underside of maple leaves, and sometimes abundant at New Brunswick.

P. imbricator Fitch. Occurs on the leaves of beech, and is the "*Schizoneura imbricator*" of the previous edition.

P. populicaulis Fitch. Makes galls at junction of stem and leaf of "*Populus monilifera*," Passaic (Bt); also elsewhere in State.

P. populiglobuli Fitch. Also found on "*Populus*" at Passaic (Bt).

P. populivenæ Fitch. Makes galls on veins of poplar leaves.

P. rhois Fitch. Common on leaves of sumac (Bt); throughout the State (Sm); Caldwell (U S Ag).

P. tessellata Fitch. The "alder blight." Sometimes very common locally, in September and October, forming conspicuous masses.

P. vagabundus Walsh. Sometimes locally common on poplar.

Sub-family SCHIZONEURINÆ.

COLOPHA Monell.

- C. ulmicola* Fitch. Makes the well-known cockscomb gall on elm; locally and seasonally common throughout the State.

SCHIZONEURA Hartig.

- S. corni* Fabr. A woolly louse on various species of dogwood, but also found on a variety of grasses and other plants.
- S. lanigera* Hausm. The "woolly apple-louse." More or less common throughout the State, but never really injurious. It forms galls on roots, and clusters in masses about wounds on the trunk and branches. In the latter condition it is easily reached by the kerosene emulsion. Root treatments have not hitherto been necessary in New Jersey. Occurs also on other plants and trees, and is the "americana" of the last edition.
- S. rileyi* Thos. (*ulmi* Riley.) A woolly louse on American elm.

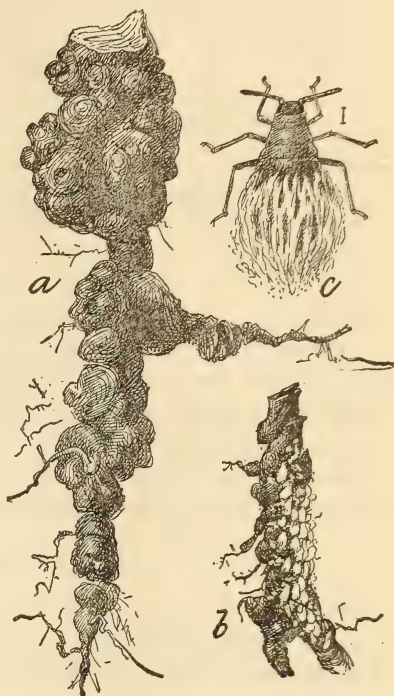


Fig. 46.—Woolly apple louse; injury to the roots is shown at *a*; adult at *c*, showing the woolly fibres, much enlarged.

Sub-family LACHNINÆ.

PHYLLAPHIS Koch.

- P. fagi* Linn. Trenton (U S. Ag); on beech.

LACHNUS Burm.

- L. abietis* Fitch. Occurs on spruce in the Appalachian and Highlands areas.
- L. alnifoliae* Fitch. Occurs on leaves of alder.
- L. laricifex* Fitch. Occurs on the American larch or tamarack.
- L. quercifoliae* Fitch. On the leaves of oak.
- L. salicelis* Fitch. Found locally on willows.
- L. strobis* Fitch. A feeder on white pine; sometimes locally common.

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LONGISTIGMA Wilson.

- L. caryæ** Harr. Locally common on hickory, walnut, linden, etc., and accused of killing trees in some instances.

Sub-family APHIDINÆ.

CLADOBIUS Koch. (MELANOXANTHUS.)

- C. saliciti** Harr. Occurs on willow, poplar, maple, etc.; sometimes common at New Brunswick late in the season, the relatively large winter eggs attracting attention. "*Salicicola* Uhler" of the last edition is the same.

CHAITOPHORUS Koch.

- C. aceris** Linn. A common species on maple; sometimes seriously injurious to Norway maples in early summer.
C. negundinis Thos. Found infesting box elder.
C. pinicolens Fitch. Feeds upon pine.
C. populifoliæ Fitch. On leaves of poplar. The New Jersey species found on poplar have not been determined.
C. viminalis Monell. On willow, poplar and maple; locally common.

CALLIPTERUS Koch.

- C. asclepiadis** Monell. A common species on milkweeds.
C. bellus Walsh. Infests red and other oaks.
C. betulæcolens Fitch. A species of wide distribution on birch.
C. caryæ Monell. Found on hickory and walnut.
C. castaneæ Fitch. On leaves of the American chestnut.
C. discolor Monell. A feeder on oak. There are several species of this genus that occur on oak, and our forms have not been determined.
C. trifolii Monell. One of the clover-leaf plant-lice.
C. ulmifolli Monell. On leaves of the American elm.

MONELLIA Oestl.

- M. caryella** Fitch. A species of wide distribution on hickory.

DREPANOSIPHUM Koch.

- D. acerifolii** Thos. A species of wide distribution on maple; common in New Jersey on the soft maple.

HYALOPTERIS Koch.

- H. arundinis** Fab. River Edge, Newark, Vineland (U S Ag); a common species on prune and plum. Is the "*pruni*" of last edition.

APHIS Linn.

- A. ambrosia** Raf. On the various species of ragweed.
- A. asclepiadis** Fitch. Occurs on various species of milkweeds.
- A. brassicæ** Linn. The common cabbage plant-louse. Occurs throughout the State and often in destructive numbers.
- A. cerasifoliæ** Fitch. Common on wild cherry in Hunterdon Co. (Sm).
- A. cornifoliæ** Fitch. On the leaves of dogwood and "Cratægus."
- A. gossypi** Glover. The melon-plant louse: occurs throughout the State, but much more commonly in the southern counties, where it often destroys entire crops. It occurs also on a great variety of weedy plants on which it passes the winter, migrating to the melon fields in June. In ordinary seasons only a few hills in a field become infested in that month, and from these the spread is in every direction. Covering these hills with tight boxes, tubs or hay caps, and evaporating beneath them carbon bisulphide at the rate of 1 tablespoonful to every cubic foot of space will often check the spread of the species over the field and save the crop. Once they are generally distributed the whale-oil soap is the only satisfactory remedy.
- A. forbesi** Weed. The strawberry-root louse. Locally and seasonally common in the light sandy soils of southern New Jersey, and rarely injurious. In the more northern parts almost entirely absent.
- A. maidis** Fitch. The corn-plant louse. Sometimes quite plentiful, but not injurious in New Jersey.
- A. maidiradicis** Forbes. The corn-root louse. A very destructive species in the middle west, but in New Jersey of only occasional occurrence. Found also on the roots of a variety of weedy plants and attended by ants that care for the winter eggs and colonize the young on proper plants in spring.
- A. mali** Fabr. The apple-plant louse. Occurs throughout the State, sometimes in great numbers, causing serious injury. Spray very early when this species is noticed in numbers, to kill off the stem-mothers and their first brood before they cripple the leaves so as to serve as shelters. "Malifoliæ" is now considered a form of this species.
- A. persicæ-niger** E. F. Smith. The black-peach louse. Plentiful throughout the State south of the Piedmont plain and most abundant in the lighter sandy soils where the root form often does serious injury to young trees. On the Piedmont plain and northward it is rare and never injurious. Tobacco dust worked in a trench over the roots around the tree is more or less satisfactorily used as a remedy.
- A. prunicola** Kalt. Newark, Vineland (U S Ag); on plum.
- A. prunifoliæ** Fitch. A widely-distributed species on plum.
- A. quercifoliæ** Walsh. Feeds on oak, soft maple and button ball.
- A. rumicis** Linn. The bean-plant louse. Generally distributed, sometimes common, but never, in my experience, injurious in New Jersey.

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SIPHOCORYNE Passerini.

S. salicis Monell. Occurs on various species of willow.

RHOPALOSIPHUM Koch.

R. berberidis Fitch. Feeds on barberry.

R. dianthi Schrank. Kinkora (U S Ag). On pinks, carnations and ger-man ivy. In greenhouses throughout the State.

R. rhois Monell. A feeder on sumac.

R. solani Thos. Tomato-plant louse; sometimes does serious injury in parts of Salem and Gloucester Counties (Sm).

R. violæ Pergande. On violets in greenhouses throughout the State.

MYZUS Passerini.

M. cerasi Fabr. Very abundant throughout the State on cherry and sometimes does severe injury. This is one of the black lice, very resistant to ordinary sprays, and best dealt with in late September when the sexed forms appear.

M. mahaleb Fonsc. On plum, and a great variety of other plants.

M. persicæ Sulz. The green-peach louse. Throughout the State, but never in harmful numbers so far as I am aware.

M. ribis Linn. Occurs throughout the State on currant. Causes a distortion and reddish discoloration of the leaf which is sometimes quite conspicuous and occasionally injurious.

PHORODON Passerini.

P. humuli Schrank. The hop-plant louse. Throughout the northern part of the State wherever hops are grown, and reported also at Freehold (U S Ag). The winter food is plum and only the summer forms occur on hop.

NECTAROPHORA Oestl.

N. avenæ Fabr. (*granaria* Kirby.) The wheat-louse. Occurs throughout the State, and, in the southern counties, sometimes in destructive numbers. Ordinarily kept in check by its natural nemies, and when it does occur in numbers insecticide applications are generally impracticable.

N. cucurbitæ Thos. On squash and pumpkins. Sometimes rather abundant late in the season, but never in harmful numbers.

N. fragariæ Koch, var. *immaculata* Riley. On leaves of strawberry.

N. lactucæ Kalt. Lettuce-plant louse.

N. pisi Kalt. (*destructor* Johns.) The pea-louse. Throughout the State south of the Piedmont plain, and seasonally common and destructive. Less abundant in the more northern counties.

N. rosæ Linn. Throughout the State on rose; often common and injurious. Tobacco decoction is, on the whole, the most effective material against this species.

- N. rubi** Kalt. A blackberry-plant louse which I have seen abundantly at Hammonton, and occasionally in smaller numbers elsewhere in the State.
- N. liriodendri** Monell. Sometimes common on leaves of tulip trees. In harmful numbers at Vineland in 1899.
- N. rudbeckiæ** Fitch. Occurs commonly on ragweed, golden-rod and other plants.
- N. viticola** Thos. Montclair, Perth Amboy (U S Ag), and generally throughout the State on grape.

Family ALEYRODIDÆ.

This little family, popularly known as "white flies," contains only a few small species in New Jersey, and most of these are of practically no importance except on plants under glass. "White flies" are dangerous pests in Florida and California on citrus plants, and occur in numbers in warmer countries generally. They somewhat resemble plant lice in appearance, but are covered with a fine whitish powder or flour. In the larval stage they somewhat resemble scales, but as adults both sexes have four well-developed wings.

In the last edition only three species were listed, and very little collecting has been done to increase this number in New Jersey; but Dr. W. E. Britton, of Connecticut, has recently devoted considerable time to the study of these little creatures, and he has been good enough to prepare the following list of species, which he thinks will certainly be found in our territory when properly sought for.

ALEYRODES Latr.

- A. abutilonea** Hald. Infests "Abutilon avicennæ" in Pennsylvania and should be found in New Jersey.

- A. actææ** Britton. Described from Connecticut on baneberry, "Actea alba" (W. E. B.), and will probably occur in New Jersey.

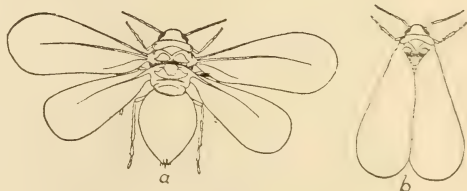


Fig. 47.—*Aleyrodes citri* with wings spread at *a*, and in natural position at *b*; much enlarged.

- A. coryli** Britton. Described from Connecticut, where it occurs throughout the State; locally common on hazel nut and occasional on blackberry (W. E. B.). Should occur in New Jersey.
- A. corni** Hald. On "Cornus sericea" in Pennsylvania, and should be found in New Jersey.
- A. fernaldi** Morrill. Massachusetts and Connecticut on Spiræa.
- A. forbesi** Ashm. (aceris Forbes.) Massachusetts to Illinois, on silver maple (W. E. B.), and should occur in New Jersey.

- A. morrilli** Britton. Connecticut and New York; locally very abundant on "*Impatiens fulva*" (W. E. B.), and will probably be found in New Jersey.
- A. mori** Quaintance var. *maculata* Morrill. Massachusetts and Connecticut, on ash, hornbeam, catalpa and hackberry, and should occur in New Jersey (W. E. B.).
- A. packardi** Morrill. Massachusetts, Connecticut and probably throughout the eastern United States on strawberry (W. E. B.).
- A. vaporarium** West. The "white fly" or plant-house "*Aleyrodes*." A common pest of green-houses throughout the State. "It has been found on over sixty different kinds of plants, but is especially injurious to tomato, melon, cucumber, ageratum lantana, fuchsia and heliotrope when grown under glass" (W. E. B.).
- A. waldeni** Britton. Described from Connecticut, but will probably be found in New Jersey. Occurs sparingly, but widely scattered, on leaves of "*Juglans cinerea*" and "*nigra*" (W. E. B.).

The "*A. brassicae* Wlk." of the previous edition is probably not found in America at all.

Family COCCIDÆ.

These are the "scale insects," broadly speaking, characterized by a degraded, larva-like form in the female, and by the presence of a single pair of wings only in the male. The latter is further peculiar in having a complete metamorphosis, a long anal style or filament and an extra pair of eyes replacing the mouth, which, in this sex, is not used at all for feeding purposes.

There are several sub-families, differing much in habit and structure, but in New Jersey we need refer to only three main series, the "mealy bugs," included in the "*Dactylopinæ*"; the "soft scales," included in the "*Coccinæ*," and the "armored scales," included in the "*Diaspinæ*." In the "*Ortheziinæ*" we have no out-door species. In the "*Dactylopinæ*" there are the ordinary "mealy bugs" of the green-house, having no sort of protective covering, and therefore easily reached by penetrating contact insecticides; the species of "*Phenacoccus*" and allies, which have long waxy filamentous secretions, partly or wholly covering the insects at certain seasons; and the species of "*Kermes*," occurring mostly on oak, which have no powdery or filamentous covering. The species of "*Phenacoccus*" may be reached during the winter by diluted oil mixtures, and in summer, when massed, may be often destroyed on shade trees by solid jets of water.

The soft scales are species of usually considerable size, waxy surface texture, and more or less convex form. The "scale" is merely the thickened surface of the insect itself, and not a separate or separable structure. These insects are not easily reached by insecticides, except in the larval stage, and we have several of them that are more or less troublesome,

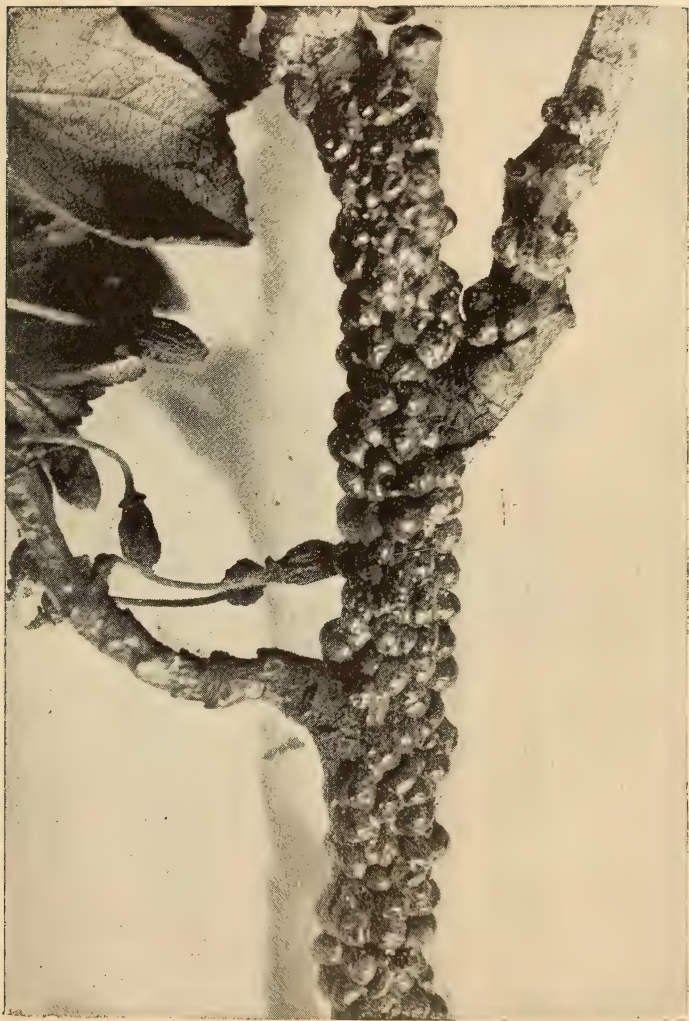


Fig. 48.—A soft scale; adult females.



notably the "cottony maple scale," the "tulip soft scale" and the "terrapin scale" of peach.

The armored scales are usually small in size, and the scale, although excreted by the insect, forms no part of it, and may be removed without necessarily injuring the creature covered by it. In this series are our most destructive species and those most difficult to deal with. Some of these scales are oviparous, laying eggs which winter under the protection of the scale; others are viviparous, wintering in the partly grown condition. The "San José Scale" is an example of a viviparous form, and this may be reached in winter when the plants are dormant by caustics, like the lime and sulphur washes, or by penetrants, like the oil emulsions or soluble oils. The oviparous forms, like the "oyster shell scale" and "scurfy scale," cannot be satisfactorily reached in winter, but must be dealt with when the young larvæ are moving in spring. At that time soap mixtures

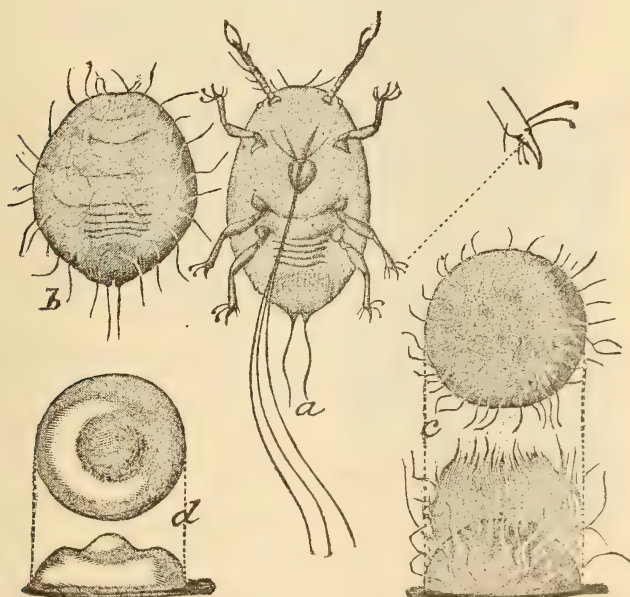


Fig. 49.—Development of an armored scale: *a*, active larva with lancets extended; *b*, somewhat contracted, with waxy filaments ready to run together; *d*, first scale just formed, from above and side; all much enlarged.

or oil emulsions of moderate strength thoroughly applied produce good results. It is practically impossible to go into details of treatment here, because each species must be dealt with according to its own peculiarities.

The scale fauna of the State is not well known. No collectors have devoted themselves specifically to this family, and the records of the office deal mostly with the common orchard species. In compiling this

list I have in general followed the excellent catalogue prepared by Mrs. M. E. Fernald, and published as a special bulletin of the Hatch Experiment Station of the Massachusetts Agricultural College.

Dr. W. E. Britton, of the Connecticut Station, who has paid much attention to the scale insects in this section of the country, and who has especially collected the species found in greenhouses and on ornamental plants, has been good enough to supply me with a series of notes indicating those species which from his experience he feels certain will occur in New Jersey. Quite a number of these species are confined to greenhouse plants and are unable to maintain themselves outdoors, hence, strictly speaking, they are not a part of the New Jersey fauna. They have been included, however, as matter of information and to call attention to them.

Sub-family ORTHEZIINÆ.

ORTHEZIA Bosc.

- O. insignis* Dougl. The common greenhouse "Orthezia" occurring on a great variety of ornamentals, as well as on strawberry, tomato and other cultural plants. Not found in the fields.

Sub-family DACTYLOPINÆ.

ASTEROLECANIUM Targ.

- A. quercicola* Bouché. On various species of oak throughout the State, usually on single trees, and never abundant enough to be harmful. Easily recognized by its circular form and golden color.

KERMES Boit.

- K. andrei* King. On oak from Massachusetts to Georgia.
K. galliformis Riley. On oak. Recorded from New Jersey by Fernald.
K. kingii Ckll. On red oak Cockerell believes it occurs in New Jersey.
K. pettiti Ehrh. Mass. and N. Y. on oak, and should occur in New Jersey.
K. pubescens Bogue. Lakehurst on oak (Ds).
K. quercus Linn. Widely distributed on oak.
K. trinotatus Bogue. Recorded from New Jersey.

GOSSYPARIA Sign.

- G. spuria* Mod. Local on elm throughout the State; never common nor really injurious.

ERIOCOCCUS Targ.

E. azaleæ Comst. Found on *Cratægus*, *Rhododendron* and *Azalea*.

PHENACOCCLUS Klll.



Fig. 50.—*Phenacoccus acericola*: *a*, the cottony masses covering adult females on leaf; *b*, young females and males on the bark; natural size.

P. acericola King. The maple false scale. Referred to as "*Pseudococcus aceris*" in the last edition and in economic publications. Locally common on sugar maple, often massing on the trunks in dense clumps and sometimes causing serious injury. In cities and towns where water pressure is available, turning on a solid jet from the hose at short range serves to destroy many of the insects.

P. americanæ King & Klll. Found in the nest of the ants "*Lasius americanus*."

PSEUDOCOCCUS Westw.

- P. citri** Risso. Common mealy bug. Found in greenhouses throughout the State and on a great variety of plants, cultural and ornamental. Soap mixtures are usually found successful against these insects, but must be frequently applied until the species is gotten under control.
- D. longispinus** Targ. Another common mealy bug, the "adonidum," of the last edition. Occurs on ferns, cycas and other greenhouse plants.
- D. sorghiellus** Forbes. Feeds on sorghum and also found in the nests of ants of various species of "Lasius."
- D. trifolii** Forbes. Clover root mealy bug; sometimes abundant enough to be injurious.

Sub-family COCCINÆ.

PULVINARIA Targ.



Fig. 51.—Cottony maple scales: *a*, *Pulvinaria acericola* on leaf; *b*, *P. innumerabilis* on the twigs.

- P. acericola** Walsh & Riley. A cottony scale on maple leaves; not really common in New Jersey, but g. d.
- P. innumerabilis** Rathv. The "cottony maple scale." Occurs throughout the State, chiefly on soft maple, but also on grape and Virginia creeper. Found chiefly on twigs and branches and sometimes seriously injurious to shade trees.

COCCUS Linn.

- C. hesperidum** Linn. The commonest of the larger brown, soft scales. Found on "Oleanders" and on many greenhouse plants everywhere. Not an out-door species in New Jersey.
- C. longulus** Dougl. Another common species in greenhouses. Infests palms, ferns, "Acacia," "Myrica," "Citrus," &c.

EULEUCANIUM Ckll.

- E. armeniacum** Craw. The apricot scale; found also on plum, pear, cherry, peach, &c., but not abundantly enough to be injurious.
- E. canadense** Ckll. Massachusetts to Ohio on elm, maple, oak, hickory and peach, and should be found in New Jersey.
- E. caryæ** Fitch. Found on hickory, elm, wild cherry, &c.
- E. cerasifex** Fitch. New York plum scale. On cherry, plum, peach, apple, pear, &c.; not common nor injurious in New Jersey.
- E. corylifex** Fitch. On "Corylus" and "Viburnum."
- E. cynosbati** Fitch. On gooseberry and "Gleditschia."
- E. fitchii** Sign. Found in New York on raspberry and blackberry.
- E. fletcheri** Ckll. On "Arbor vitæ" in N. Y. and Mass., and probably New Jersey.
- E. juglandifex** Fitch. The butternut scale.
- E. kingii** Ckll. On sassafras and *Vaccinium corymbosum* in Mass. and Conn.
- E. juglandis** Bouché. Not rare locally, but never really injurious in New Jersey.
- E. lintneri** Ckll. & Benn. On sassafras in N. Y. and probably in New Jersey.
- E. nigrofasciatum** Perg. The "terrapin scale." Common and injurious on peach in certain sections of Cumberland County; local and rare elsewhere in the State.
- E. persicæ** Fabr. The "peach scale." Local and not common. Found also on plum, quince, gooseberry, grape, rose and other plants.
- E. pruinsum** Coq. The "frosted scale." Infests a great variety of orchard and forest trees.
- E. prunastri** Fonsc. New York and probably New Jersey on plum and peach.
- E. pyri** Schr. On pear, apple, hickory and white thorn.
- E. quercifex** Fitch. On oak, New York, Mass., and probably New Jersey.
- E. quercicitroneis** Fitch. Widely distributed on oak, elm, ironwood, chestnut, &c.

- E. ribis* Fitch. The "currant scale." Found on currant, gooseberry, mulberry, &c.
- E. tulipiferae* Cook. Throughout the State on the tulip tree and sometimes in harmful numbers. The largest and most offensive of the soft scales in our State.

SAISSETIA Depl.

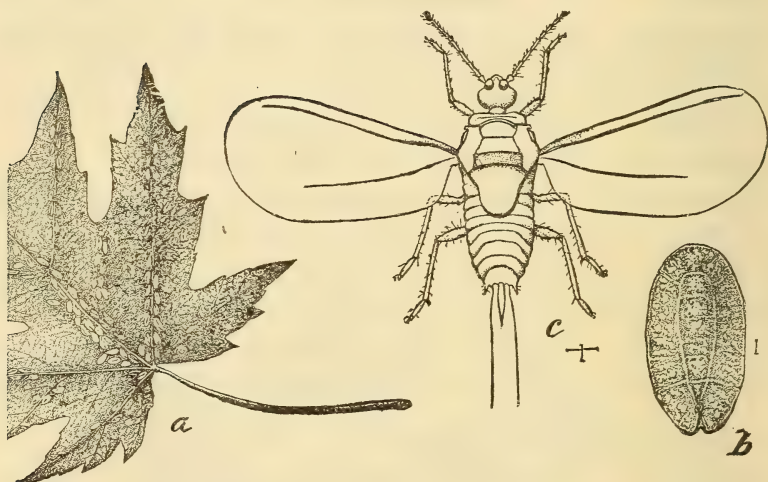


Fig. 52.—Cottony maple scale: *a*, leaf covered with young scales; *b*, male scale; *c*, adult male; *b* and *c* much enlarged.

- S. filicum* Bdv. Common on ferns in greenhouses.
- S. hemisphaerica* Targ. Common on palms, ferns and other greenhouse plants and often very injurious.

Sub-family DIASPINÆ.

CHIONASPIS Sign.

- C. americana* Johns. The "elm tree white scale" Chatham IV, 29 (Britton). Found throughout the eastern and central United States on American and other elms.
- C. caryæ* Cooley. Connecticut to District of Columbia on hickory.
- C. corni* Cooley. On dogwood. I have seen what I take to be this species on several occasions in Middlesex and Mercer Counties.
- E. euonymi* Comst. Common throughout the State on "Euonymus," and sometimes destructive. Also taken on "Celastrus scandens."

C. furfurus Fitch. The "scurfy scale" or "Harris louse." On orchard trees, chiefly apple and pear, throughout the State, and sometimes destructive. Also occurs on poplar and other shade trees; rarely in troublesome numbers.

C. lintneri Comst. Locally common on alder in neighboring States and probably in New Jersey.

C. ortholobis Comst. Mass. to Ohio and probably New Jersey, on poplar and willow.

C. pinifoliae Fitch. Not uncommon on pine trees throughout the State, and sometimes locally abundant.

C. salicis-nigræ Walsh. A common willow scale found at New Brunswick and elsewhere in the State. Occurs also on poplar, tulip tree, dog-wood, etc.

C. spartinæ Comst. Found on the salt marsh grass, "*Spartina stricta*."

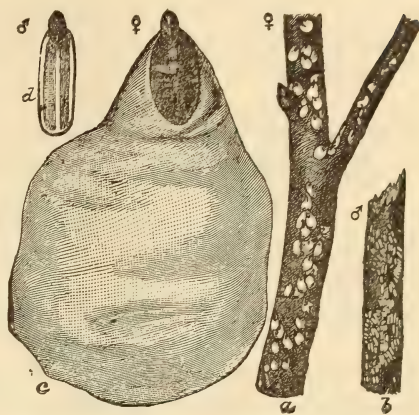


Fig. 53.—Scurfy scale, *Chionaspis furfurus*, a, twig infested by female; b, by male scales; c, female; d, male scale; much enlarged.

DIASPIS Costa.

D. boisduvalii Sign. A hot-house scale found on palms, Acacia and other ornamental plants.

D. bromeliae Kern. Massachusetts to District of Columbia on various green-house plants.

D. carueli Targ. A Juniper scale. Found occasionally in nurseries, and no doubt distributed by them throughout the State, principally on the trailing variety.

D. juniperi Bouché. Another Juniper scale, but also found on arbor vitæ in nurseries.

D. echinocacti Bouché, var. **cacti** Comst. A common green-house scale.

AULACASPIS Ckll.

A. pentagona Targ. The "West India peach scale." Has occurred sparingly on young peach trees in South Jersey, but seems not to do well. The scale is a very destructive one where it thrives.

A. rosæ Bouché. The "Rose Scale." Throughout the State. Thrives best on plants growing in the shade. Also attacks blackberry and raspberry; sometimes in destructive numbers.

PINNASPIS Ckll.

P. buxi Bouché. On boxwood. I have seen this on some old nursery stock, and on one occasion in Burlington County on an old hedge.

FIORINIA Targ.

- F. fioriniæ** Targ. A common green-house scale on many different kinds of plants.

EPIDIASPIS Ckll.

- E. piricola** Del Guer. The "European pear scale." Has been introduced on European nursery stock, but has not established itself as an injurious species.

ASPIDIOTUS Bouché.

- A. abietis** Schr. Burlington County, on pine. Occurs also on fir and hemlock.
- A. ancylus** Putn. On apple throughout the State; usually on young trees; never troublesome; infests also a variety of other trees.
- A. comstocki** Johns. Infests maple trees.
- A. cyanophylli** Sign. A common green-house pest on palms, orchids, etc.
- A. forbesi** Johns. The "cherry scale." Not uncommon in parts of Burlington County and occasional elsewhere in the State. Infests also apple, pear, quince, currant, etc., but thus far not really injurious.
- A. hederæ** Vall. (*nerii* Bouché.) The Oleander scale. Infests almost every Oleander I have seen, and occurs also on ivy, holly, box, and many other garden plants.
- A. juglans-regiæ** Comst. Throughout the eastern United States, on walnut, locust, maple and a number of orchard trees.
- A. ostreæformis** Curt. Has been found in New Jersey on pear, but occurs also on most other orchard and many forest trees.

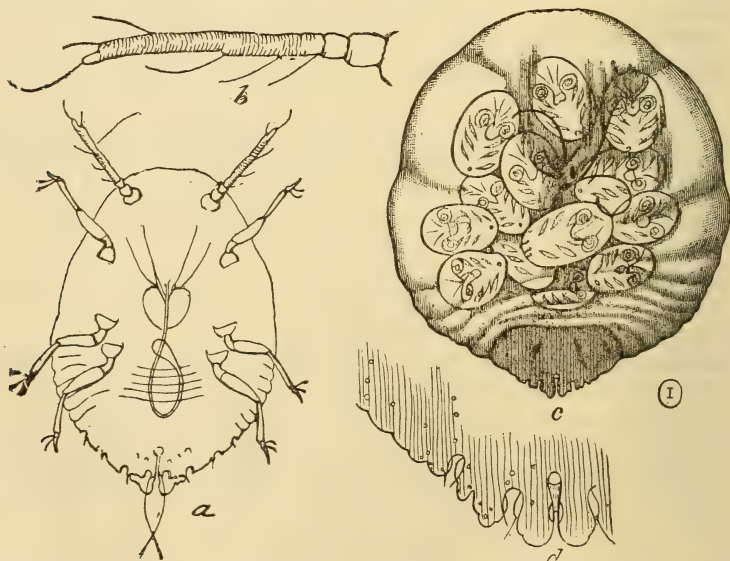


Fig. 54.—*a*, larva of pernicious scale; *b*, its antenna; *c*, adult female showing embryos through body wall; *d*, tip of anal plate of female; all greatly enlarged.

- A. perniciosus** Comst. The "pernicious" or "San José Scale." Occurs throughout the State on all orchard trees save certain cherries, and also on some shade trees. The most abundant and destructive of all our species.
- A. rapax** Comst. The "greedy scale." Occasional on walnut, but occurs also on a variety of other trees.
- A. ulmi** Johns. Found on the smooth inner bark of the trunk of the elm under the upturned edges of the rough or outer bark (W E B).
- A. uvæ** Comst. The "grape scale." Have taken this at Egg Harbor.
- A. oxycoccus** Woglum. Described from New Jersey on cranberry.

CHRYSOMPHALUS Ashm.

- C. aonidum** Linn. (*ficus* Ashm.) In green-houses on palms and rubber plants.
- C. aurantii** Mask. Red scale of California, occasionally found on green-house plants.
- C. dictyospermi** Morgan. On palms in green-houses; sometimes quite a pest.
- C. obscurus** Comst. On willow-oak, eastern United States generally.
- C. tenebricosus** Comst. The "Gloomy Scale." On red maple, District of Columbia and probably New Jersey.

LEPIDOSAPHIS Schimer.

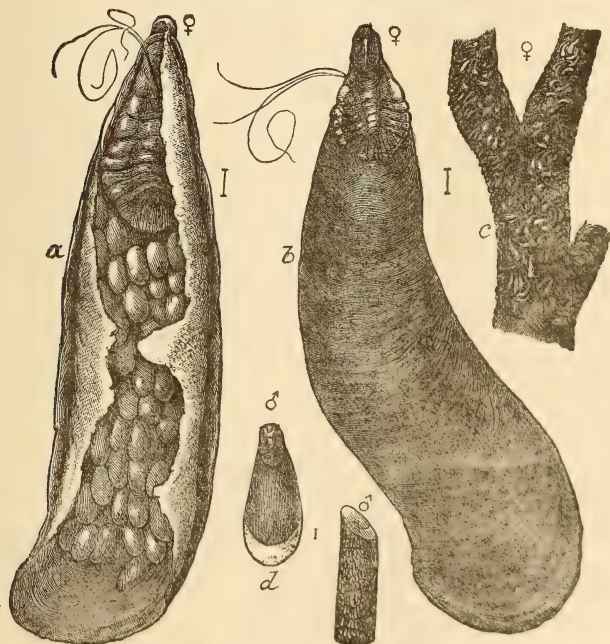


Fig. 55.—Oyster shell bark louse, *Lepidosaphis ulmi*: a, female scale from beneath, filled with eggs; b, same from above; c, twig infested with female scales; d, male scale and a twig infested by them; scales greatly enlarged.

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- L. gloverii** Pack. Elizabeth (U. S. Ag). Occurs on magnolia and also in green-houses, on all sorts of Citrus plants.
- L. beckeri** Newm. (*citricola* Pack.) Purple scale. Found commonly on oranges and lemons in market, and in green-houses.
- L. ulmi** Linn. The common "oyster-shell scale," listed as "*Mytilaspis pomorum* Bouché" in the previous edition, and so referred to in the publications of the Experiment Station. Infests a great variety of orchard, forest and shade trees throughout the State and is sometimes destructive to orchard, shade and forest trees.
- L. neusteadii** Sulc. A Japanese species introduced on nursery stock, infesting the conifer "*Sciadopitys verticillata*."

ISCHNASPIS Douglas.

- I. longirostris** Sign. Occurs on palms in green-houses, Conn. to D. C.

PARLATORIA Targ.

- P. pergandii** Comst. The "Chaff" scale. On Citrus plants in green-houses.

Order HEMIPTERA.

These are the true "bugs," or "half-winged" insects so termed, because the fore-wings have the base thickened and the tips membranous. The same character also gives them the name Heteroptera or different winged, and not infrequently the two are combined into Hemiptera-Heteroptera as against the Hemiptera-Homoptera. In this series the beak is always more free and the head more mobile than in the Homoptera, and in many cases the beak can be projected straight forward like a snout. The number of visible joints in the rostrum varies, the apparently three-jointed forms with short, thick rostræ, being usually predatory, while those which have it four-jointed, long and slender, are more generally plant feeders, but there are numerous exceptions. The transformations are always incomplete and feeding is always done, in all stages, by piercing and sucking, whether of plant or animal tissues. In the species in which the beak is long and four-jointed it often bends in the middle when the insect is feeding, the lancets only being inserted and the terminal joint of the beak serving to steady and guide. Many injurious and some destructive species are found in this order in which, by the bye, many have peculiar and disagreeable odors.

Since the publication of the last edition our knowledge of this order has increased greatly and the classification has been materially changed, while still greater modifications are proposed. Mr. J. R. de la Torre Bueno, who is one of the younger students, has very kindly suggested the present arrangement along very conservative lines, and he has added much information and many records to the list. In fact, as it stands, it is really his list with other records added, except in the Capsidæ, or, as they are known, the Miridæ, in which Mr. Otto Heidemann has again arranged the series for me. Mr. H. G. Barber, of Roselle Park, New Jersey, has also been good enough to look over the list critically, and he has corrected many of the Paulmier records of the previous edition, the collection of that gentleman having come into Mr. Barber's hands after the death of its maker.

Quite a number of Uhler manuscript names have been omitted, and, although over 100 names have been added, the number of species not authenticated by actual records is lessened rather than increased. About 400 species are here listed. Mr. Bueno thinks that at least 500 occur in the State, and this leaves plenty of opportunity for additional work by collectors.

Division TROCHALOPODA.

Super-family CIMICOIDEA.

Family PENTATOMIDÆ.

These are the "shield bugs"; medium to large-sized species as a rule, rarely small, with more or less enlarged scutel covering a considerable part of the upper surface. Their habits vary, some of them are predatory, a few feed indifferently on plant or insect tissue, the majority are plant feeders, and, as a whole, to be accounted injurious.



Fig. 56.—A Pentatomid and its beak.

Sub-family SCUTELLERINÆ.

Large, often bright-colored, very convex species in which the scutel is so enormous as to cover almost the entire abdomen.

TETYRA Fab.

- T. bipunctata* H. S. Lakehurst IV-IX (div); DaCosta VI, 3 (Dke); Browns Mills V, VI (div). Sometimes found on young shoots of old pines, but is especially fond of young trees. In cold weather often secretes itself among the dead needles that accumulate on the upper side of the horizontal branches of pitch pine; hibernates as an adult (Ds).

STETHAULAX Bergr.

- S. marmoratus* Say. Lakehurst IV-VI, IX, common on cedars (div).

HOMŒMUS Dall.

- H. æneifrons* Say. Hewitt VII, 2, 25 (Jl); Oak Ridge VII (Shoemaker); Westfield VII, 2 (Bno); local in distribution and limited in time of appearance.

EURYGASTER Lap.

- E. alternatus* Say. Hewitt VI-VIII (div); West Hebron VI, IX (Bno); Staten Island VII (Ds); on edges of marshy meadows; often common.

Sub-family GRAPHOSOMINÆ.

AMAUROCHROUS Stal.

- A. cinctipes* Say. (Podops) Throughout the State all season.
A. dubius Pal. Beauv. (Podops) Chester, Arlington (Coll); New Jersey III (Ds).
A. parvulus Van D. Pt. Pleasant V, on sea beach, Lakehurst V, not common (Brb).

Sub-family CYDNINÆ.

Peculiar in this series of species by having the feet formed for digging. They live in sand and mud banks and are of no economic importance.

CYDNUS Fab.

C. obliquus Uhl. Jamesburg VII (Ds).

CYRTOMEMUS Am. & Serv.

C. mirabilis Perty. Staten Island VIII (Ds); Camden V, 5 (Jn); Woodbury VII, 29 (Ss).

PANGÆUS Stal.

P. bilineatus Say. Madison (Pr); Arlington (Coll); Riverton IV, 16 (Jn); Avalon VI, Anglesea (Ss).

GEOTOMUS M. & R. (MELANÆTHUS Uhl).

G. pennsylvanicus Sign. (*picinus* Uhl.) "Atlantic States" (Uhl).

G. robustus Uhl. Anglesea (Ss).

AMNESTUS Dall.

A. spinifrons Say. Great Notch V, Madison X, Pt. Pleasant on beach V (Brb); Staten Island V, VI (Ds); Newark, New Brunswick IV, Jamesburg V, 31 (Coll); Riverton IV, V (Jn); Anglesea (Ss).

A. pusillus Uhl. (*subferrugineus*.) Madison V, X (Brb); Glen Ridge VI, 27 (Bno); New Brunswick IV, VIII (Coll); Merchantville X, 29 (Ss).

SEHIRUS A. & S. (CANTHOPHORUS M. & R.).

S. cinctus Pal. Beauv. Greenwood Lake VII, Lakehurst V (Brb); New Brunswick VII (Coll).

Sub-family PENTATOMINÆ.

In this series the scutel tends to become smaller and the wings are better marked. The insects are, as a rule, flatter above and not so firm in texture as some of the preceding groups. The beak is long, four-jointed, and many of the species are economically important. The typical "buggy" odor is well developed in most of them.

BROCHYMENA A. & S.

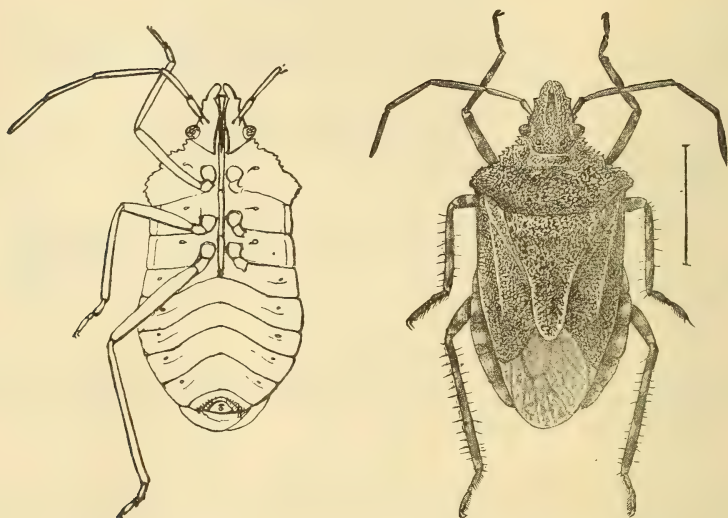


Fig. 57.—A tree-bug, *Brochymena arborea*; upper and under surface.

- B. arborea** Say. Throughout the State IX till next VI. The species are large, rough, known as "tree-bugs," often present in numbers sufficient to attract attention, yet not conspicuous because their grayish-brown tints harmonize well with the bark of the trees on which they live.
- B. quadripustulata** Fab. With the preceding and hardly less common.
- B. annulata** Fab. Lakehurst IV–VI, IX (div). The "harisii" of previous edition is a form of this species.

PERIBALUS M. & R. (HOLCOSTETHUS Fieb).

- P. limbolarius** Stal. Throughout the State, V–IX, common on shepherd's purse. The "abbreviatus" of last edition is the same—the true species is western.

TRICHOPEPLA Stal.

- T. semivittata** Say. Throughout the State V–IX, common.

CHLOROCHROA Stal. (PENTATOMA Oliv).

- C. saucia** Say. (Lioderma) Staten Island IV, IX, XI (div).
- C. senilis** Say. (Lioderma) Staten Island, fall and spring (Ds); Lakehurst X, 19 (Bno).
- C. uhleri** Stal. Occurs in New York and probably also in New Jersey.

- C. persimilis* Horv. This is the species usually found as "juniperina" Linn., in collections; but that is European and does not occur in America at all.

MORMIDEA A. & S.

- M. lugens* Fab. Throughout the State, common, V-IX.

SOLUBEA Bergr. (ÆBALUS Stal).

- S. pugnax* Fab. Ft. Lee VIII, 12 (Bno); Manasquan IX (Ds); Burlington Co. VIII, 7, Barnegat Bay Dist. VIII, 3 (Coll); Anglesea VII (div).

EUSCHISTUS Dall.

- E. fissilis* Uhl. Throughout the State V-X, the most common species.
E. servus Say. Madison (Pr); Staten Island VI-X, Jamesburg VII (Ds); Lakehurst V (Brb).
E. politus Uhl. Throughout the State V-XI, locally common.
E. tristigmus Say. Throughout the State IV-IX, locally common; in marshy meadows.
E. variolarius Pal. Beauv. Throughout the State all season, often common.
E. ictericus Linn. Madison (Pr); Ft. Lee IX, X (div); Glen Ridge VI, 28, Pt. Pleasant VII, VIII (Bno); Staten Island VIII (Ds); New Brunswick VII, Jamesburg VII, Lahaway VII, Anglesea, V, 28, IX, 6 (Coll).

CÆNUS Dall.

- C. delius* Say. Hewitt VI (Jl); Singac, Oak Ridge IX, Staten Island V, VI, VIII, IX (Ds); Westfield VII, 16 (Bno); Orange Mts. VII, 10 (Jn); Madison VI, IX, X, Roselle Park XI, Lakehurst V, common (Brb); hibernates as adult under stones in fields.

HYMENARCYS A & S.

- H. æqualis* Say. Madison, rare (Pr); New Jersey (Van D).
H. nervosa Say. Madison VIII, rare (Brb); Staten Island IV, VIII (div); Jamesburg V, X, Anglesea IV, 4 (Coll); Westfield VII, 21, Clementon V, 30 (Jn).

NEOTIGLOSSA Kirby.

- N. undata* Say. Cape May VI, 22 (Coll); New Jersey (Van D).
N. sulcifrons Stal. Anglesea VII, 4 (Sm); Lakehurst V (Brb), VII, 4 (Dow).

COSMOPEPLA Stal.

- C. carnifex** Fab. Chester VII, 5 (Coll); Newfoundland VII, Oak Ridge VI, VII (Ds); Madison VII, Ft. Lee dist. IV (Brb); Great Notch V, 30 (Bno); sometimes locally common.

MENECLES Stal.

- M. insertus** Say. Sparta, Staten Island XI, 11 (Ds); Chester, Monmouth Co. V, 9 (Coll).

THYANTA Stal.

- T. custator** Fab. Madison VII (Brb), and south of the red shale throughout the season; recorded by all collectors.

MURGANTIA Stal.

- M. histrionica** Hahn. The "harlequin cabbage bug." This is a southern species that under special conditions sometimes extends into New Jersey, and has been taken as far north as Morris County. In 1896 it occurred in destructive numbers along the Delaware, but since then only occasional examples have been taken.

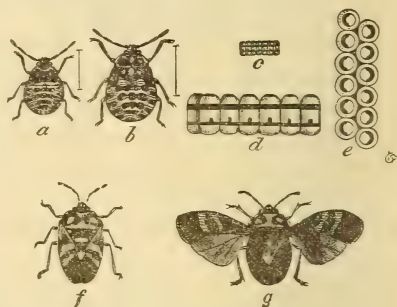


Fig. 58.—The harlequin cabbage bug: *a, b*, larva and pupa, natural size; *c, d, e*, eggs, natural size and enlarged, from side and above; *f*, adult, wings closed, and *g*, open; natural size.

NEZARA A & S.

- N. pennsylvanica** De G. Throughout the State, fall and spring.
- N. hilaris** Say. Throughout the State all season; not rare.

BANASA Stal.

- B. calva** Say. Madison (Pr); Palisades IX, 4 (Jl); Staten Island X, Lakehurst IX (Ds); Riverton VIII, 21 (Jn).
- B. dimidiata** Say. Madison VI, VIII, X (Brb); Staten Island VI-VIII, Lakehurst V-VII, X (Ds); Pt. Pleasant VII, VIII (Bno); Clementon V, 2 (GG).
- B. sordida** Uhl. Massachusetts to Maryland, and sure to occur in New Jersey.

DENDROCORIS Bergr.

- D. humeralis** Uhl. (Liotropis) Greenwood Lake V, Madison VIII, common (Brb); Farmingdale VIII (Ds); Lakehurst V-IX (div).

Sub-family ASOPINÆ.

STIRETRUS Lap.

S. anchorago Fab. Hackettstown (U S Ag); Madison VIII, rare (Brb); Jamesburg VII, 7 (Ds); South Jersey (Coll); a predatory form that sometimes attacks asparagus slugs.

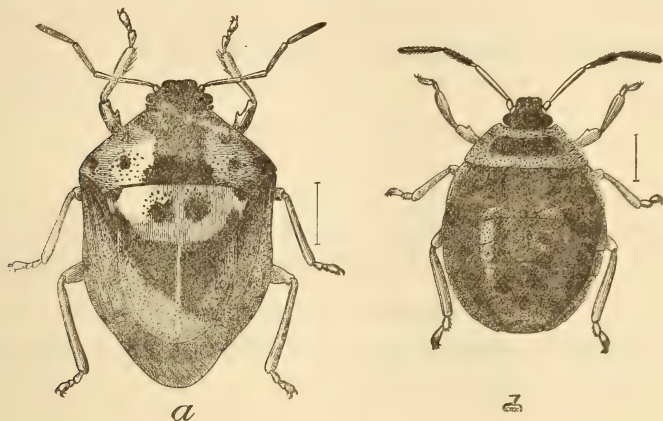


Fig. 59.—*Stiretrus anchorago*; a, adult; b, nymph.

PERILLOIDES Schout. (PERILLUS.)

- P. exaptus* Say. Hewitt V, 1 (Bno); Madison VI, Roselle Park (Brb); Oak Ridge VI (Shoemaker).
P. circumcinctus Stal. Throughout the State VI, VII, not common; feeds on beetle larvæ; the records for "confluens" in last edition belong here.
P. bioculatus Fab. (Mineus) Staten Island VI (Ds).

MINEUS Stal.

- M. strigipes* H. S. Madison VII, 10 (Brb); Westfield VII, 4, Pt. Pleasant VII, 27 (Bno); Jamesburg V, 11, VII (Coll); Lakehurst VII, 4 (Dow); Iona V, 16 (GG).

APATETICUS Dall. (PODISUS H. S.)

- A. cynicus* Say. Morris Co. (Jn); Madison VII, X (Brb); Hewitt VII, Brookville VII, Staten Island VIII, IX (Ds); Newark VII, Lakehurst VII, 7 (Coll). The species of this genus are quite usually predatory, and feed upon slugs of all kinds, including those of the potato beetles.

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- A. bracteatus** Fitch. Certain to occur in New Jersey (Bno).
A. maculiventris Say. (*spinosus* Dall). Common throughout the State all season.
A. serieventris Uhl. Recorded from all sections of the State VI-VIII, but there is a question of determination involved, and most of the specimens may prove "*maculiventris*."
A. modestus Dall. Madison IX, common (Brb); Staten Island IV (Ds).
A. placidus Uhl. Hewitt VII, 25 (Jl); Madison VIII (Brb); Staten Island VIII (Ds); Jamesburg (Coll); Lakehurst VII (div).

Sub-family ACANTHOSOMINÆ.

ELASMUCHA Stal.

- E. lateralis** Say. (*Acanthosoma*) Hewitt VII, 2 (Bno); Chester IX, 18 (Coll); Madison VII (Brb); Staten Island IV, IX (div); Anglesea (Ss).

ELASMOSTETHUS Fieb.

- E. cruciatus** Say. (*Acanthosoma*) Del. Water Gap VII, 8 (Jn); Chester VII, 4 (Coll); Madison VIII (Brb).

Family THYREOCORIDÆ.

These are the *Corimelænidæ* or "negro bugs" of the previous edition, so named because of their generally uniform black color. They are shining, convex, almost as broad as long, the scutel covering almost the entire abdomen, and they resemble beetles of the *Histeridæ* more than they do the usual run of bugs. They lay their eggs in black and raspberries, and these eggs have a peculiar bed-buggy flavor, which becomes offensively apparent when the fruit is eaten.

THYREOCORIS Schrank. (*CORIMELÆNA* White.)

- T. unicolor** Pal. Beauv. (*atra* A & S.) Throughout the State V-VIII, sometimes locally common.
T. nitiduloides Wolff. With the preceding, but more rare. The form that occurs in New Jersey is said to be a variety, the typical form being western.
T. lateralis Fab. Hewitt VI, Newfoundland VII, Staten Island VII, Jamesburg VII (Ds). Mr. Barber suggests that this is "*gillettii*" Van D.
T. anthracina Uhl. Pennsylvania, and sure to occur in New Jersey.
T. gillettii Van D. Staten Island V (Brb); Cape May C. H. VIII, 21 (Van D); Anglesea VII, 12 (Coll).

T. pulicaria Germ. Throughout the State V-VIII; often common; occurs also on the salt marshes.

Family ARADIDÆ.

This family contains the "flat bugs," so named because of their form, which is adapted for life in the narrowest sort of crevices, under bark or in cracks of dead trees. They are generally dark brown or blackish in color, are believed to be predatory in habit, and seem to be essentially forest species, isolated trees rarely being infested.



Fig. 60.—A negro bug, *Thyreocoris pulicaria*; enlarged.

Sub-family ARADINÆ.

ARADUS Fab.

- A. æqualis** Say. New Jersey (Uhl, Bergroth).
- A. quadrilineatus** Say. Palisades (Jl); State Island IV, 10 (Ds).
- A. robustus** Uhl. Ft. Lee VII (Jl); Madison, Lakehurst VI, a common species (Brb).
- A. similis** Say. Greenwood Lake V (Brb); Great Notch V, 30 (Bno); Staten Island IV, 10 (Ds); Lakehurst (Jl); Clementon V, 2 (GG). Commonly found in and under the fungus "Polyporus betulinus" growing on dead white birches or, in winter, nymphs and adults under bark near base (Bno).
- A. hubbardi** Heid. Almost undoubtedly in New Jersey (Bno).
- A. acutus** Say. Lakehurst (Ds); Anglesea IV, 11 (Coll).
- A. inornatus** Uhl. Prospertown, Lahaway VII, 3 (Coll).
- A. crenatus** Say. Pennsylvania and probably also New Jersey.
- A. lugubris** Fall. (*rectus* Say.) Staten Island (Ds).
- A. uniformis** Heid. Probably occurs in New Jersey.
- A. abbas** Bergr. New Brunswick IV (Coll).
- A. cinnamomeus** Panz. Staten Island IV, 10 (Ds); Lakehurst V, 27 (Bno); Clementon V, 2 (GG); common on pines.
- A. niger** Stal. Lakehurst IV, 14 (Ds); also under pine bark.

Sub-family MEZIRINÆ.

MEZIRA A & S. (BRACHYRHYNCHUS Lap).

- M. lobata** Say. Should be found in New Jersey (Bno).
- M. granulata** Say. Occurs from Canada to Maryland.

NEUROCTENUS Fieb.

N. simplex Uhl. Throughout the State, fall to late spring.

N. ovatus Stal. Should also occur in New Jersey (Bno).

ANEURUS Curtis.

A. inconstans Uhl. Westfield VII-IX (Bno); Staten Island V, Perth Amboy V, 12, 31 (Ds); Riverton VIII, 17 (Van D).

A. fiskei Heid. Ft. Lee VII, 19 (Jl); Staten Island VI, 26 (Ds); under bark of dead hickory saplings, dead oak branches, etc.; sometimes in company with the preceding.

Family PYRRHOCORIDÆ.

Resemble the next following Lygæidæ in form, but are stouter, with contrasting red and black colors and a different venation in the membrane of wing-covers. They are known as "red-bugs," where they occur commonly, but we have only a single representation in our territory which, while a plant feeder, is not injurious.

LARGUS Hahn.

L. succinctus Linn. Jamesburg IX, 4, Lahaway VI, 7, Atlantic Co. (Coll); Lakehurst V-IX (div); Toms River (Brb); Clementon VIII (Jn); Atco VIII, 27 (Ss).

Family LYGÆIDÆ.

Narrow, oblong bugs, flattened above, of moderate or small size, often gay colors and medium or soft texture. The position of the antennæ and venation of membrane of primaries afford structural characters by which the student recognizes the group. All are vegetable feeders and some of them are distinctly injurious.

Sub-family LYGÆINÆ.

ONCOPELTUS Stal.

O. fasciatus Dall. Caldwell (Cr); Roselle Park IX (Brb); Staten Island VI, VII, IX, X (Ds); Riverton IX, 25 (Jn); Pemberton VII, 11, very common on milkweed (C G); Woodbury VI, Anglesea (Ss).

LYGUS Fab.

L. bicrucis Say. (Melanocoryphus) Staten Island, seashore V, 14 (Ds); Woodbury, Anglesea VII (Ss); Clementon VII, 6 (Jn).

L. reclinatus Say. So distributed that its occurrence in New Jersey is probable (Bno).

L. kalmii Stal. Common throughout the State IV-X. This is the species usually labeled "turcicus" in collections.

L. turcicus Fab. All New Jersey specimens seen have proved to be "kalmii," but it is recorded from Pennsylvania by Montandon and should occur in this State also (Bno).

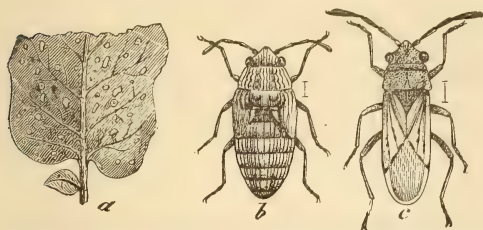


Fig. 61.—*Nysius ericæ*: a, potato leaf showing injury; b, nymph; c, adult; a, natural size, b, c, much enlarged.

NYSIUS Dall.

N. ericæ Schill. (*angustatus* Uhl). Camden IX, X (Ss); Westville V, 20 (Jn); Lakehurst VII, 7 (Dn); Lahaway, common on cranberry bogs, Anglesea V, 28 (Coll).

N. longiceps Stal. New Jersey (Stal).

N. minutus Uhl. Woodbine VIII, 23 (Van D); New Jersey (Uhl).

N. providus Uhl. Madison VII, VIII, X (Brb); Orange Mts. VIII, 29 (Gr); Jamesburg VII, 18 (Coll); Lakehurst VII, 7 (Dn); Pt. Pleasant VII, 26 (Bno).

BELONCHILUS Uhl.

B. numenius Say. Anglesea (Ss).

ORSILLUS Dall.

O. scolopax Say. Jamesburg VII, 15 (Coll). May be an error and finally prove to refer to *Nysius providus* (Bno).

ISCHNORHYNCHUS Fieb.

I. geminatus Say. (*didymus* Zett.) Throughout the State all season; also labeled "resedæ" in collections, but is not really Panzer's species (Bno).

CYMUS Hahn.

C. luridus Stal. Pt. Pleasant VII, 26 (Bno).

C. discors Horv. Madison (Pr); Roselle Park XI (Brb); Glen Ridge (Bno); Jamesburg VII, 15 (Coll).

C. angustatus Stal. Throughout the State IX until next VII. The records for "*Cymodema tabida*" in last edition really belong here.

C. clavculus Hahn. Throughout the State, fall and spring.

C. breviceps Stal. Madison VIII, Lakehurst IX (Brb).

CYMODEMA Spin.

- C. exiguum** Horv. (*tabida* Say.) Thus far recorded only from the District of Columbia, but may occur in So. Jersey. The records in the last edition almost certainly refer to "*Cymus angustatus*" (Bno).

Sub-family BLISSINÆ.

ISCHNODEMUS Fieb.

- I. falicus** Say. Glen Ridge VII (Bno); Staten Island V, VI, IX (Ds); Lahaway, common on cranberry bogs in May (Sm).

BLISSUS Klug.

- B. leucopterus** Say. Roselle Park I, sifting (Brb); Caldwell (Cr); Glen Ridge VI, 1, Staten Island X, 25 (Bno); Camden IV, 22 (Ss); Anglesea VII, 12 (Coll). This is the well known "Chinch bug" that is so destructive in the wheat and cornfields of the middle west. In New Jersey, while it occurs throughout the State, it is really a somewhat rare species, not often found even by the collector. The reason for our exemption is climatic and is not due to any natural enemy or parasite peculiar to this region.

Sub-family GEOCORINÆ.

GEOCORIS Fall.

- G. uliginosus** Say. Madison IX, X, Ft. Lee IX (Brb); Camden X-XII (Ss).
G. punctipes Say. Madison, rare (Pr); Riverton IX, 25 (Jn); Merchantville X, 29 (Ss).
G. discopterus Stal. New Jersey (Stal).
G. limbatus Stal. New Jersey (Stal).
G. piceus Say. Madison VIII (Brb); Camden Co. XI, 23 (Ss); commonly found on "*Potentilla canadensis*" (Bno).
G. bullatus Say. Alabama to Nova Scotia and sure to occur in New Jersey. The species of this genus are found crawling about the roots of weeds in sandy spots, and sometimes under boards in winter. They have not been closely collected, and more will be found when search for them is systematically made.

Sub-family PACHYGRONTHINÆ.

PHLEGYAS Stal. (PELIOPELTA Uhl.)

- P. abbreviata** Uhl. Budds Lake VII, Madison VII, VIII (Brb); Orange Mts. VIII, 29 (Gr); Ft. Lee Dist. VII, 4, Westfield VII, 16, Lakehurst V, 23 (Bno); Staten Island VI, VII (Ds); Jamesburg V, VI (div); Riverton V, 30 (Vk); So. Jersey, Swedesboro VII (Coll).

CEDANCALA A. & S.

- Ce. crassimana** Fab. (*dorsalis* Say.) Madison VIII, Lakehurst IV, XI (Brb); Jamesburg VIII, 15, Lahaway V, on cranberry bogs (Sm).

Sub-family OXYCARENINÆ.

CROPHIUS Stal.

- C. disconotus** Say. New Jersey (Stal).

Sub-family APHANINÆ.

LIGYROCORIS Stal.

- L. diffusus** Uhl. (*sylvestris* Stal, not Linn.) Greenwood Lake VI, Madison VII, IX (Brb); Chester VIII, IX (Coll); Westfield VIII, 13, Staten Island X, 25, (Ds); Jamesburg VII, X (div).
- L. contractus** Say. (*sylvestris* Fieb., not Linn.) Palisades VIII (Brb); Westfield VII, IX (Bno).
- L. constrictus** Say. Chester VIII, IX (Dn); Camden IX, 30 (Ss); New Jersey (Stal).

PERIGENES Dist.

- P. fallax** Heid. Chester VIII, 12 (Dn); Madison VII, Staten Island VI, Jamesburg VII (Brb).

MYODOCHA Latr.

- M. serripes** Oliv. Hopewell IV, Madison VII, Ft. Lee Dist. III, Roselle Park XI, Arlington III (Brb); Orange Mts. VIII, 29 (Gr); Staten Island III, V, VII, IX, XI, Jamesburg VII (Ds); Camden X, XII (Ss); Lahaway V, VII, XII (Sm).

HERÆUS Stal.

- H. plebejus** Stal. Madison IV, VI, Roselle Park, XII, 1, sifting (Brb); Camden XI, XII, common (Ss).
- H. orbicollis** Uhl. Chester, Newark, Arlington, Anglesea III, 19, Lahaway V, on cranberry bogs (Coll). Seems to be a mss. name and Mr. Barber thinks may be the same as above.

PAMERA Say.

- P. bilobata** Say. Camden XI, XII (Ss). Mr. Bueno says the species is southern and the record may refer to the next following.
- P. basalis** Dall. Westfield VII, Glen Ridge VI, Pt. Pleasant VII (Bno); Madison VII, Roselle Park XI, Lakehurst III, IV (Brb); Camden, Merchantville (Ss); Ocean Co. V (Coll).

PTOCHIOMERA Say.

- P. nodosa* Say. Lakehurst IX (Brb).
P. clavigera Uhl. Lakehurst V, 2, IX (Brb).

PYGÆUS Uhl.

- P. pallidus* Uhl. Ft. Lee, Lakehurst IV, sifting (Brb).

CLIGENES Dist.

- C. minutus* Berg. Lakehurst IX (Brb); Lahaway V, on cranberry bogs (Sm). Is the same as "*Pachymerus minutus*" Uhl., mss.
C. pilosula Stal. New Jersey (Stal).

CNEMODUS H. S.

- C. mavortius* Say. Hewitt VI, Brookville VII, Staten Island V (Ds); Lakehurst IV, VII, X (div).

OZOPHORA Uhl.

- O. picturata* Uhl. Staten Island XI (Ds); Riverton VIII, 21 (Jn); Camden Co. (Ss); Anglesea VII, 23 (Coll).

DRYMUS Fieb.

- D. unus* Say. (*Megalonotus*) Roselle Park V, sifting under Alder (Brb); Jamesburg XII, 1 (Dn); Avalon IV, 10 (Coll).

PERITRECHUS Fieb.

- P. fraternus* Uhl. Lakehurst III-V (Brb); Lahaway, on cranberry bogs V (Coll).

SPHRAGISTICUS Stal.

- S. nebulosus* Fall. (*Trapezonotus*) Lakehurst IV (Brb); Camden XII (Ss).
S. rufipes Stal. Lakehurst V (Brb).

ARPHANUS Dist.

- A. umbrosus* Dist. (*Dorochroa illuminatus* Dist.) New York to District of Columbia, and I have seen it from New Jersey (Sm).

EMBLETHIS Fieb.

- E. vicarius* Horv. Lakehurst IV (Brb).

E. arenarius Linn. is a misidentification of the Linnæan species, and *Gonianotus marginepunctatus* is probably this same form (Bno).

EREMOCORIS Fieb.

- E. ferus** Say. Paterson IV, Madison III, X (Brb); Staten Island IV (Ds); Lakehurst IV, VII, X (div); Anglesea III, 19 (Coll).

CRYPTHULA Stal.

- C. parallelogramma** Stal. Camden (Ss); Lakehurst V (Brb).

SCOLOPOSTETHUS Fieb.

- S. atlanticus** Horv. New Jersey (Horv).
S. diffidens Horv. Lakehurst IV (Brb).
S. thomsoni Reut. Roselle Park XI, by sifting (Brb).

Family COREIDÆ.

Oblong, moderately stout species of medium or rather large size, flattened above, the common squash-bug being a fair representative of the family. The hind legs are sometimes abnormally developed, the femora large or clubbed or the tibiæ with leaf-like expansions; sometimes the edges of the abdomen are raised at the sides so that the wings lie in a depression. The odors in this family are especially well developed, more penetrating and more offensive than in any other. Most of them are vegetable feeders, and some are of economic importance.

Sub-family MEROCORINÆ.

CORYNOCORIS Mayer.

- C. typhæus** Fab. Chester VII, 20 (Coll); Madison VII, VIII, Milltown VIII (Brb); Westfield VII, IX (Bno); Staten Island VI (Ds); Riverton VII, 3 (Jn). The "distinctus" of previous edition was an error of determination.

Sub-family MICTINÆ.

ARCHIMERUS Burm.

- A. calcarator** Fab. Madison (Pr); Ft. Lee VIII (Bno); Staten Island VI, IX (div); Clementon V, 30 (Jn); Anglesea VI, 20 (Coll).

ACANTHOCERUS Pal. Beauv.

- A. galeator** Fab. (*Euthoctha*) Throughout the State VI-IX; not rare.

Sub-family ACANTHOCEPHALINÆ.

ACANTHOCEPHALA Lap.

- A. terminalis* Dall. (Metapodius) Piedmont Plain and northward, IX until next VII; also Riverton (Jn). The "femoratus" of previous edition is this same species.

Sub-family ANISOSCELINÆ.

LEPTOGLOSSUS Guer.

- L. oppositus* Say. Staten Island X (Ds); New Brunswick VIII, 23 (Coll); Lakehurst V (Brb); Shiloh IX, 1 (Jn).
L. corculus Say. New Brunswick (Coll); Westville VII, 4 (Jn).

Sub-family CHARIESTERINÆ.

CHARIESTERUS Lap.

- C. antennator* Fab. Madison (Pr); Ft. Lee (Bt); Staten Island VIII, Jamesburg VII, 5, Lakehurst VII, 29 (Ds); Farmingdale VII (Jn); Camden (Ss).

Sub-family CENTROSCELINÆ.

ANASA A & S.

- A. tristis* De G. The common squash bug; occurs throughout the State. Hibernates as an adult, lays eggs in large patches on underside of leaves of all sorts of Cucurbs, and matures two broods. In gardens gather the conspicuous eggs early in the season and destroy them. In fields plow out and destroy the vines as soon as crop is off, to prevent adults from coming to maturity. Insecticides are not indicated.
- A. armigera* Say. Also on squashes and other cucurbs from New Brunswick southward. I have no records from more northern points, but believe it will occur there as well. Under ordinary circumstances it will not be differentiated from "tristis."
- A. repetita* Heid. Also resembles the common species so closely as to be readily mistaken for it. I have no actual Jersey records, but it has been found in Pennsylvania, and I have no doubt it occurs with us.



Fig. 62.—The squash-bug, *Anasa tristis*; enlarged.

Sub-family MICRELYTRINÆ.

PROTENOR Stal.

- P. belfragei** Hagl. Staten Island VIII (Ds); Jamesburg VII, 18 (Coll); in wet meadows on grasses.

Sub-family ALYDINÆ.

ALYDUS Fab.

- A. urinus** Say. Throughout the State VI-IX; everywhere common.
- A. pilosulus** H. S. With the preceding, but less common. "These two species are commonly found in patches of clover in meadows or in bush clover." (Bno).
- A. quinquespinosus** Say. Throughout the State VI-IX.
- A. conspersus** Mont. Newfoundland IX (Ds).

STACHYOCNEMUS Stal.

- S. apicalis** Dall. Riverton V, 26 (Jn), VIII, 17 (Van D); found running on sandy spots in company with "Cicindela" (Bno).

Sub-family CORIZINÆ.

HARMOSTES Burm.

- H. reflexulus** Stal. Common throughout the State all season. The "fraterculus" of previous edition also belongs here.

CORIZUS Fall.

- C. crassicornis** Linn. (*novæboracensis* Sign.) Chester IX, 5 (Coll).
- C. lateralis** Say. Common throughout the State, late VI until winter, and again until late next V. All records of other species in previous list should in all probability refer here. *C. sidæ* Fab. has never been authentically recorded north of Maryland (fide Hambleton), and should not be included in any lists from the middle States (Bno).
- C. nigristerium** Sign. Is recorded from New York and Pennsylvania and certainly occurs in New Jersey.

Sub-family BERYTINÆ.

These are the "stilt-bugs"; long, slender species with thin, thread-like legs and antennæ. The thighs and feelers are clubbed, and, altogether, the insects have a peculiar spidery appearance. They are plant feeders, but of no economic importance.

NEIDES Say.

- N. muticus** Say. Greenwood Lake V (Brb); Hewitt VII, Staten Island VIII (Ds).

JALYSUS Stal.

- J. spinosus** Say. Throughout the State V, VII-IX, locally common.

Family **TINGITIDÆ.**

These peculiar little creatures have been called "lace-bugs" from the net or lace-like covering of the wings and other body parts. This renders them easy of recognition, and, under a lens of even moderate power, they are really pretty. They are plant feeders and sometimes occur in numbers sufficient to cause injury to garden plants or shrubs. As field pests they are not troublesome in New Jersey, and, in general, contact poisons would be advised against them should they become in the least dangerous.

Sub-family **PIESMINÆ.**

PIESMA Lep. & Serv.

- P. cinerea** Say. Locally common throughout the State on horse chestnuts, under bark of "Platanus," &c.

Sub-family **TINGITINÆ.**

CORYTHUCA Stal.

- C. ciliata** Say. Chester VIII, 19 (Dn); Staten Island (Ds); New Jersey (Sm). On sycamore in great numbers on under side of leaves; adults hibernate under bark and under leaves at base of tree (Bno).
C. arcuata Say. (juglandis Fitch.) Throughout the State all season, on a variety of trees, but most abundant on walnut.
C. gossypii Fab. Palisades VII, 4, Pt. Pleasant VII, 26 (Bno).
C. pergandei Heid. Roselle Park XI-II, sifting under Alder, on which it feeds (Brb); Staten Island VI, 9 (Ds); Lakehurst IX, 20 (Bno).
C. marmorata Uhl. New York to North Carolina, and sure to occur in New Jersey.

LEPTOBYRSA Stal.

- L. explanata** Heid. Newfoundland VII, 8 (Ds); Springfield, Rutherford V-VII, IX (Dn); on Kalmia and Rhododendron.

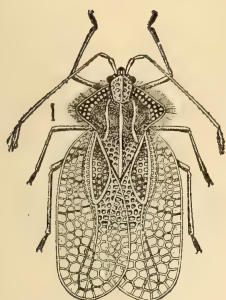


Fig. 63.—A lace-bug,
Gargaphia angulata;
much enlarged.

GARGAPHIA Stal.

- G. amorphæ* Walsh. Lakehurst IX (Brb).
G. tilizæ Walsh. New York to Virginia, on bass-wood.
G. fasciata Stal. Found in Pennsylvania and probably in New Jersey.

LEPTOSTYLA Stal.

- L. oblonga* Say. Greenwood Lake V, Jamesburg VII (Brb); Lakehurst VII, 4, Lahaway, V, VIII (Coll); on cranberry bogs (Sm).

MELANORHOPALA Stal.

- M. clavata* Stal. (Tingis) Westfield through VII, the short-winged form only (Bno); Staten Island VIII (Ds); Jamesburg VII (Brb).

PHYSATOCHEILA Fieb.

- P. plexa* Say. Madison VIII, IX, Lakehurst IV (Brb).

LEPTOYPHA Stal.

- L. mutica* Say. Madison VI, rare (Brb).

TELEONEMIA Costa.

- T. elongata* Uhl. "United States" (Uhl).

Super-family NEPOIDEA.

Family NABIDÆ.

These are yellowish or black, rather flattened bugs, predatory in character, found on flowers and vegetation generally, seeking what they may devour. They are useful in destroying many small vegetable feeders in the early stages. Our collections are poor and not well determined, so the list is, as yet, largely guess work. It is more than likely that all and more will be found with us when systematic collections are made.

PAGASA Stal.

- P. fusca* Stein. (*pallipes* Stal.) Madison VIII, IX, Jamesburg VI (Brb); lives under stones in fields (Bno).

REDUVIOLUS Kirby. (CORISCUS Schrank.)

- R. subcoleoptratus* Kirby. Madison VI, common (Brb); Oak Ridge VI, VII, Staten Island V (Bno); New Jersey (Ss).
R. sericans Reut. Probably found in New Jersey (Bno).
R. sordidus Reut. Probably occurs in New Jersey (Bno).
R. pallescens Reut. "New Jersey" (Brb).

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- R. annulatus* Reut. Madison (Pr); Riverton IX, 11 (Jn).
R. inscriptus Kirby. Canada to Virginia.
R. rufusculus Reut. Occurs from New York to Virginia.
R. ferus Linn. Common throughout the State IV–XII, and the best known representative of this family.
R. capsiformis Germ. Probably occurs in New Jersey.
R. kalmiæ Reut. Occurs near the line in Pennsylvania.
R. roseipennis Reut. (*punctipes* Reut.) "New Jersey" (Reut).
R. propinquus Reut. New York and probably New Jersey (Bno).
R. vicarius Reut. Will probably be found in New Jersey (Bno).
R. assimilis Uhl. Ranges from Canada to Maryland.

Family GERRIDÆ.

This aggregation comprises the "water striders," "marsh treaders" and other species that live in wet places or on the water surface. As a rule, the body is narrow and elongated, covered with a velvety pile adapted to shed or repel water. The legs are long and slender, and the insects are adapted to move rapidly over the surface of the water, resembling spiders when the legs are fully extended. They are predatory in habit in all stages, and where they occur in numbers no *Anopheles* or other mosquito larvæ are able to maintain themselves.

Sub-family VELIINÆ.

RHAGOVELIA Mayr.

- R. obesa* Uhl. Hewitt VII, Cranford VIII, Staten Island VII, VIII, Lakehurst VII, X (Ds); Bloomfield VI, Rahway River VIII, Lakehurst IX; a very common species in swiftly running streams (Bno).

MICROVELIA Westw.

- M. marginata* Uhl. (*capitata*) Ft. Lee X, 10, Cranford VIII, 6 (Bno).
M. albonotata Champ. Westfield V, 3, VII, VIII, 13, Staten Island VII, 8 (Bno); Riverton VIII, 3 (Jn).
M. americana Uhl. (*Hebrus*) Westfield VII, 4–IX, 2, Cranford VIII, Ft. Lee Dist. V, 28, IX, X, 10, Staten Island VI, 3, VIII, 19 (Bno).
M. boreale Bno. (*pulchella* Westw.) Westfield VI–IX, Bloomfield VI 30, Cranford VIII, Ft. Lee Dist. VII–IX, Staten Island V–VIII (Bno).
This is the species usually labelled "*pulchella*" in collections, but it is really a distinct form.

Sub-family GERRINÆ.

This contains the narrower forms listed as *Hydrobatidæ* in the previous edition.

GERRIS Fab.

- G. buenoi* Kirk. Staten Island IV-VII (Ds); VIII 19 (Bno).
G. marginatus Say. (*Limnotrechus*) Throughout the State III-X, common.
G. canaliculatus Say. Echo Lake, Westfield IV-IX, Cranford VIII, 6, Ft. Lee Dist. IV, 19 (Bno); Staten Island VII, VIII (div).
G. remigis Say. (*Hygrotrechus*) Westfield VII, VIII, Bloomfield V, 23, Cranford VIII, Ft. Lee Dist. X, 20 (Bno); Staten Island III-X (Ds); Grantwood VIII, 19, Jamesburg VIII, 2 (Coll); one of our common forms.
G. conformis Uhl. Morris Co. (Jn); Great Notch V, 30, Rahway River VIII, 6 ((Bno); Lahaway VI, 1 (Coll).

LIMNOPORUS Stal.

- L. rufoscutellatus* Latr. Madison (Pr); Westfield VIII, Glen Ridge VI, 30, Ft. Lee Dist. IV-X (Bno); Staten Island VII (Ds); New Brunswick IV, 22 (Coll).

METROBATES Uhl.

- M. hesperius* Uhl. New York to North Carolina and sure to occur in New Jersey.

TREPOBATES Uhl. (STEPHANIA White.)

- T. pictus* Uhl. Echo Lake, Westfield IX, 2 (Bno); Lakehurst X, 18 (Ds).

RHEUMATOBATES Berggr.

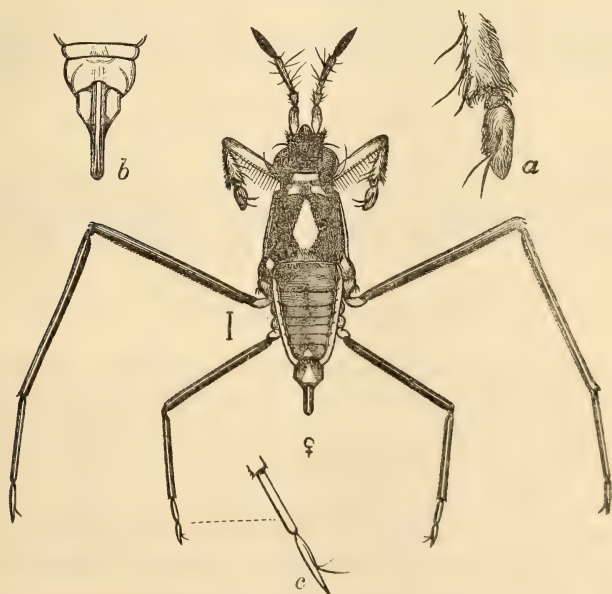


Fig. 64.—A water-strider, *Rheumatobates rileyi*, female: *a*, anterior tarsus; *b*, ovipositor; *c*, hind tarsus; much enlarged.

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R. rileyi Bergr. Madison (Pr); Echo Lake, Westfield IX, 2, Cranford VIII, 6-27 (Bno).

Sub-family MESOVELIINÆ.

MESOVELIA Muls. & Rey.

M. bisignata Uhl. Glen Ridge VI, 23, Bloomfield VI, 30, Westfield VI-IX, Cranford VIII, Ft. Lee Dist. VIII, IX, Point Pleasant (Bno); Staten Island VII-IX (div).

Sub-family HYDROMETRINÆ.

. These are the "marsh-treaders," found moving about on mud flats; they are listed as Limnobatidæ in the previous edition.

HYDROMETRA Latr.

H. martini Kirk. (*lineata* Say.) Madison (Pr); Westfield VI-IX, Cranford VIII, 27, Ft. Lee Dist. V, 21 (Bno); Staten Island IV-X (div); Camden XII (Jn).

Family NÆOGEIDÆ.

The two species in our fauna were listed under "Hebrus" in the last edition and placed under the family "Veliidæ," which the species resemble; in fact, the "Hebrus americanus" Uhl. is really a "Microvelia."

NÆOGEUS Lap. (HEBRUS Curt.)

N. burmeisteri Leth. & Sev. (*pusillus* Burm.) "United States" (Uhl).

N. concinnus Uhl. Chester, Arlington (Coll); Westfield IV, 19, VII (Bno). There may be really only a single species in New Jersey and the two names here listed may both refer to that one (Bno).

Family REDUVIIDÆ.

Called "pirate bugs" and "assassin bugs" from their predatory habits, which make them decidedly beneficial. They have long legs, the anterior often enlarged for grasping, a very narrow head with small, though prominent eyes, and a short, very stout curved beak, which is rigid and cannot be folded back against the head. These characteristics render the family an easily recognizable one, although there is a great variety in form and general appearance. A number of them have become adapted to life in cities, and, on shade trees, are of material service in reducing the number of plant feeders.

Most of the species resent being handled and will, if they get a chance, puncture the hand that holds them, or they may "bite," on general principles, if they alight on an exposed surface. The "bite" or puncture is severe and poisonous, often causing intense pain and more or less swelling, which may persist for a long time. A few species live in houses, and in the Southern States one of them attacks human beings and is known as the "big bed-bug." Another species has the more satisfactory habit of feeding on common bed-bugs and other household pests. This, while of good size, is seldom seen, because it covers itself with dust and fluffy material that accumulates in corners which make it resemble a little wad of waste.

Sub-family EMESINÆ.

This is a series of very slender species with enormously lengthened legs which has given rise to the common name "thread-legged" bugs. The anterior legs are fitted for grasping, and, slight as the insects are, they depend for their food upon species unable to resist them. They are not usually abundant.

PLOIARIOLA Reut.

P. errabunda Say. (*Cerascopus*.) Taken in adjacent States and sure to occur in New Jersey.

EMESA Fab.

E. longipes De G. Throughout the State VII-IX, not common. Occurs on bushes at the edges of fields and about barns and is said to prey on spiders.

BARCE Stal.

B. annulipes Stal. Staten Island (Ds); Lakehurst V, VII, IX, X (div).

B. simplicipes Uhl. New York and probably New Jersey; both species under planks or logs in fields (Bno).

LUTEVA Dohrn.

L. carolina H. S. Will probably be found in New Jersey (Bno).

Sub-family SAICINÆ.

ONCEROTRACHELUS Stal.

O. acuminatus Say. Greenwood Lake V, Roselle Park I, sifting (Brb); Jamesburg XII, 1 (Dn); Pt. Pleasant VIII, 8 (Bno).

Sub-family STENOPODINÆ.

PNIRONTIS Stal.

P. infirma Stal. Camden VIII, 1 (Ss).

P. languida Stal. Will probably be found in New Jersey (Bno).

PYGOLAMPIS Germ.

P. sericea Stal. Taken in adjacent States and will probably be found in New Jersey (Bno).

P. pectoralis Say. Madison VIII, Ft. Lee V (Brb); Pt. Pleasant VIII, 8 (Bno).

STENOPODA Lap.

S. culiciformis Fab. Madison (Pr); Staten Island VI, VII (Ds); Farmingdale VII, 14 (Jn); Sandy Hook VII, Anglesea VI, 28 (Coll); at light (Bno).

NARVESUS Stal.

N. caroliniensis Stal. Anglesea VII, 12 (Coll).

Sub-family ACANTHASPINÆ.

REDUVIUS Fab.

R. personatus Linn. (*Opsicætus*.) Staten Island V, VII (div); Orange Mts., New Brunswick VII, 3, Lahaway VII, 5 (Coll). This is the "bed-bug hunter" referred to in the introduction to the family.

CONORHINUS Lap.

C. sanguisugus Lec. The "big bed-bug" of the Southern States. Has not been actually taken in the State so far as I know, but has occurred in Pennsylvania, and its presence in the pine barrens may be expected.

Sub-family PIRATINÆ.

MELANOLESTES Stal.

M. picipes H. S. Madison IX, Hopewell IV (Brb); Staten Island III, IV, IX (Ds); New Brunswick, Hightstown, Lahaway VII, 5 (Coll); Atco IV, 29, Collingswood V, 4 (Ss). This and the next species made a temporary stir in 1899 as "kissing bugs," because of a number of reported cases where "bites" had caused swellings of the lips. These species bite very readily, and if, in flight, they strike the face of an individual, they are very apt to puncture promptly. There is no

doubt that some such cases did occur; there is no doubt either that the majority of the reported cases were attributable to altogether different causes. They live and develop under stones.

M. abdominalis H. S. With the preceding at about the same times.

RASAHUS A. & S.

R. thoracicus Stal. Will probably be found in New Jersey (Bno).

SIRTHENEA Spin.

S. stria Fab. (*carinata* Fab.) Westwood V, 4 (Angell); Woodbury V, from globes of electric light (div); Lahaway V, 28 (Coll).

Sub-family ECHTRICHODINÆ.

ECHTRICHODIA L. & S.

E. cruciata Say. Jamesburg VIII (Ds); Anglesea (div).

Sub-family APIOMERINÆ.

APIOMERUS Hahn.

A. crassipes Fab. Del. Water Gap VII, 14 (Jn); Jamesburg VII, 4 (Jl); Lakewood, Lakehurst VII, 7, Atlantic City VII, 19 (Coll); Tuckerton VIII, IX (Ds); Anglesea (Ss).

Sub-family HARPACTORINÆ.

MILYAS Stal.

M. cinctus Fab. Throughout the State IV-VII, IX, not common.

ZELUS Fab. (**DIPLodus** A. & S.)

Z. luridus Stal. Throughout the State VI-VIII; "exsanguis" Stal is the western form.

Z. socius Uhl. Lakewood (Coll); Lakehurst IV, V, VII, IX (div).

FITCHIA Stal.

F. nigrovittata Stal. Staten Island V, IX, XI (Ds), on salt meadow under boards (Brb); Lakehurst IV-VII, IX (div); on bushes in summer; under stones in spring (Bno).

ROCCONOTA Stal.

R. annulicornis Stal. (Heza) Westfield VII, 2 (Bno); New Brunswick VII, 27 (Coll).

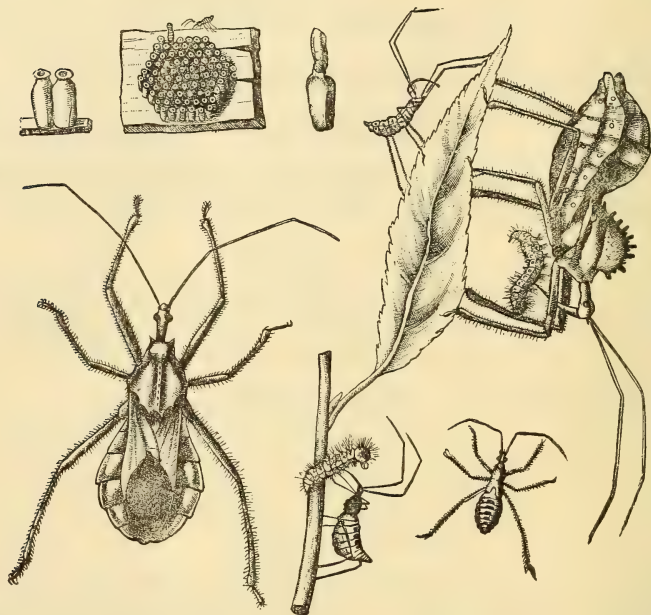


Fig. 65.—The "wheel-bug," *Arilus cristatus*, in all its stages; natural size, except the individual eggs, which are enlarged.

ARILUS Hahn.

A. cristatus Linn. (Prionidus) The "wheel-bug." Occurs throughout the State, but more commonly in the southern sections. It is the largest species of the family and conspicuous by its toothed thoracic crest, which looks from the side like the segment of a cog-wheel. The egg-masses are frequently found on fruit trees, but the insects are beneficial rather than harmful. They feed on all sorts of slugs and caterpillars, and according to Mr. Davis, also take grasshoppers and bumble-bees.

ACHOLLA Stal.

A. multispinosa De G. Throughout the State VI-X. "I have found this dropping from elm and other trees in Westfield; it is highly predateous (Bno).

SINEA A & S.

- S. diadema** Fab. Common throughout the State all summer, especially in clover patches. On city shade trees it feeds on larvæ of elm-leaf beetles, young caterpillars of all kinds and in general whatever insects it can get hold of.

Family PHYMATIDÆ.

PHYMATA Latr.

- P. erosa** Linn. (*wolfii* Stal.) This occurs in two sub-species, "*fasciata*" Gray and "*pennsylvanica*" Handl., throughout the State VII-IX. The color scheme of the peculiar chunky and angulated species is such that the specimens are able to conceal themselves in a flower so as to seem part of it, and this gives an opportunity to capture species which they could not otherwise reach. Large butterflies, and even bees are captured and killed. The fore-legs are short and very powerful, and when once the insect gets a hold and has forced its short, chunky beak into its prey it is only a matter of a short time to quiet it forever. No economically injurious insects are controlled by these species.



Phymata erosa.—*a*, *b*, adult, from above and side; *c*, front leg; *d*, beak.
Fig. 66.

Family NEPIDÆ.

These are narrow, long-legged water bugs, the fore-legs fitted for grasping, the others for walking. A pair of grooved anal bristles keeps the insects in contact with the outer air, and enables them to breathe when walking on the bottom of shallow pools, etc. The term "water scorpions" has been applied to these species without any warrant so far as danger from the anal processes is concerned.

NEPA Linn.

- N. apiculata** Uhl. Paterson VI, 15, Orange Mts. (Coll); Madison (Pr); Caldwell (Cr); Westfield VIII, 15 (Bno); Staten Island III (Ds); Riverton V, 1 (Jn).

RANATRA Fab.

- R. quadridentata** Stal. Madison (Pr); Caldwell (Cr); Ft. Lee Dist. V, VIII, IX, Cranford VIII, 27 (Bno); Staten Island V, VI, VIII, X (Ds);

Riverton VIII, 14 (Jn). To this species belong most of the records credited to "fusca" Pal Beauv., a species which probably does not occur in New Jersey at all.

- R. grisea** Bno. One of the forms mistaken for "fusca," and undoubtedly in New Jersey collections under that name.
- R. kirkaldyi** Bno. New York to North Carolina and sure to be found in New Jersey (Bno).

Division PAGIOPODA.

Super-family MIROIDEA.

Family ANTHOCORIDÆ.

This family, the Acanthiidae of the previous edition, in part contains a series of rather small, inconspicuous bugs found under bark of trees or in flowers, and mostly predatory in habit. The adults are winged, and have the membrane of the wing-cover without veins.

LYCTOCORIS Hahn.

- L. campestris** Fab. Recorded from New York, and should occur in New Jersey (Bno).
- L. domesticus** Schill. Ranges from British America to Texas.

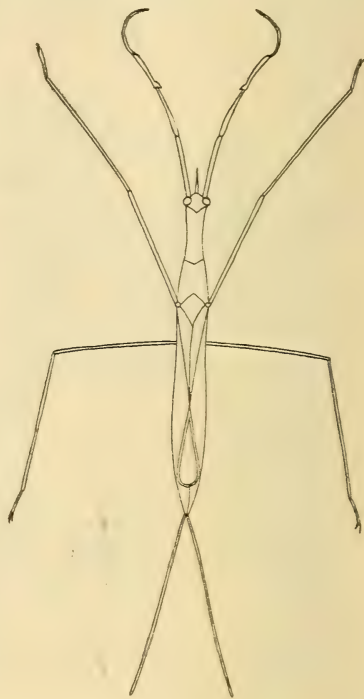


Fig. 67.—"A "water scorpion," *Ranatra* species; enlarged.

PIEZOSTETHUS Fieb.

- P. sordidus** Reut. Westfield, under bark of dead trees VIII, IX (Bno).

TRIPHLEPS Fieb.

- T. insidiosus** Say. Common throughout the State III-XII, in flowers, under bark of trees, in rubbish and generally in about all places where insects occur at all. Feeds upon insect eggs and minute forms generally.

CARDIASTETHUS Fieb.

- C. pergandei** Reut. Should occur in New Jersey.
- C. luridellus** Fieb. Pennsylvania and probably New Jersey.

ANTHOCORIS Say.

- A. musculus** Say. Probably occurs in New Jersey.

Family CLINOCORIDÆ.

CIMEX Linn.

C. lectularius Linn. The common "bed-bug."

Wingless, flattened, oval, red-brown in color, found in human habitations throughout the State. They infest not only beds but the crevices and cracks in other furniture and in the woodwork of the room. A free use of gasoline applied twice at intervals of ten days will serve to clean them out, but the applications must be thorough, and every crevice large enough to hold a bug must be dosed. The family term here used replaces the Cimicidæ of the previous list.

The bed-bug, *Acanthia lectularia*.

Fig. 68

CÆCIACUS Stal.

- CÆ. hirundinis** Jen. Infests the nests of swallows; common in parts of Burlington County and probably elsewhere in the State. Is very similar to the preceding in appearance, and a close ally in habits, but does not infest human habitation.

Family MIRIDÆ.

These are the "leaf-bugs" or "plant-bugs," recorded as Capsidæ in the previous edition. They are usually soft in texture, oval in shape, somewhat flattened above, with the membraneous tip of wings often sloping down rather abruptly. The colors are green and brown as a rule, more or less mottled and inconspicuous, but red and black bands and spots are not infrequent, and some of them present striking contrasts.

While none of the species that occur in this State are first-class pests, many are common and numerous enough to do a great deal of injury that is not always recognized. They feed, as all their allies do, on plant juices, and often puncture buds, blossoms or young shoots, crippling, checking growth or actually killing them. On some small fruits they kill the blossom stalk or even pierce the young fruit, and this kind of injury is not easily avoided. Some winter as adults; hence it is always a good plan to destroy all rubbish, &c., that may serve as a hiding place. Others lay their eggs in the stems of the plant in which they feed, and these may be reached by intelligent trimming and burning the cuttings. Contact poisons only are available for use against these insects, and these are effective only when used thoroughly and with a full understanding of the particular case in hand.

Quite a number of additions have been made to our collections since the previous edition, and again Mr. Heidemann has been good enough to supply the material for the form in which it stands at present.

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HEIDEMANNIA Uhl.

H. cixiiformis Uhl. Del. Water Gap (Slosson).

CHLAMYDATUS Curt.

C. suavis Reut. (*Agalliaestes*) New Jersey without doubt.

C. associatus Uhl. New Brunswick VII, 20 (Coll).

ATOMOSCELIS Reut.

A. seriatus Reut. New Jersey (Uhl).

PLAGIOGNATHUS Fieb.

P. obscurus Uhl. Warren Co. VIII, 13, Chester VII, 4, Plainfield VII, 4, New Brunswick VII, 20, Trenton X, 2 (Coll).

P. politus Uhl. Orange Mts. VII, 12 (Jn); Staten Island VII (Ds); Jamesburg (Coll).

P. fraternus Uhl. New Jersey (Heid).

REUTERSCOPIUS Kirk.

R. ornatus Reut. (*Episcopus*) Throughout the State, all season; more or less common locally.

PSALLUS Fieb.

P. delicatus Reut. New Jersey (Uhl).

STRONGYLOTUS Reut.

S. saliens Reut. Riverton X, 9 (Jn).

RHINACLOA Reut.

R. forticornis Reut. New Jersey (Uhl).

MEGALOCOLEUS Reut.

M. coagulatus Uhl. (*Macrocoleus*) Riverton VI, 25 (Coll); New Jersey (Uhl).

LOPUS Hahn.

L. decolor Fall. (*Oncotylus*) Madison (Pr); Jamesburg VII, 15 (Coll).

REUTERIA Puton.

R. irrorata Say. (*Malococoris*) Staten Island VIII (Ds); New Brunswick VII, 20 (Coll).

DIOMMATUS Uhl.

D. congrex Uhl. Chester VII, 4 (Coll); Madison, rare (Pr).

CERATOSCOPIUS Reut.

- C. fasciatus* Uhl. (Melinna) Madison (Pr); Staten Island VII (Ds).
C. modestus Uhl. Chester VII, 4 (Dn); Madison (Pr); Staten Island VII (Ds); Lakehurst VII, 7, Anglesea VII, 24 (Coll).
C. pumilus Uhl. Staten Island (Ds); Lakehurst VII, 7 (Coll).

ILNACORA Reut.

- I. divisa* Reut. New Jersey (Uhl).
I. malina Uhl. Madison, occasional (Pr).
I. stalii Reut. New Jersey (Ss).

DIAPHNIDIA Uhl.

- D. pellucida* Uhl. Madison, rare (Pr).

ORTHOTYLUS Fieb.

- O. flavosparsus* Sahlb. New Jersey (Heid).

ECTOPIOCERUS Uhl.

- E. anthracinus* Uhl. Lakehurst (Ds); New Jersey (Jn).

HYALIODES Reut.

- H. vitripennis* Say. Madison (Pr); Staten Island VII, VIII (Ds); Jamesburg VIII, 15 (Coll), and probably throughout the State.

DICYPHUS Fieb.

- D. famelicus* Uhl. United States generally (Uhl).

GARGANUS Stal.

- G. fusiformis* Say. Madison, frequent (Pr); New Jersey (Ss).

CYLAPUS Say.

- C. tenuicornis* Say. United States generally (Uhl).

HALTICUS Hahn.

- H. uhleri* Giard. Madison (Pr); New Brunswick VII, 20, Jamesburg VII, 15, Swedesboro VI, 12 (Coll); Camden Co. IX, 30 (Ss).

LOPIDEA Uhl.

- L. media* Say. Chester IX, 7 (Coll); Madison (Pr); Staten Island VI-VIII, Jamesburg (Ds).
 var. *robiniae* Uhl. Staten Island VII, on locust.
L. confluens Say. Del. Water Gap VIII, 12 (Jn); Staten Island VI, VIII (Ds).
L. marginata Uhl. Jamesburg VI, Lakehurst VII (Coll).

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There are at least two undescribed species in collections including "L. fuscicornis Uhl.," which is a mss. name only.

LOMATOPLEURA Reut.

L. cæsar Reut. Del. Water Gap VII, 8 (Jn); Hewitt (Ds).

STRONGYLOCORIS Blanch.

S. stygicus Say. (*Stiphrosoma*) Madison, rare (Pr); Staten Island VII (Ds); New Jersey (Coll).

S. atratus Uhl. Chester VII, 4 (Coll); New Jersey (Heid).

PILOPHORUS Hahn.

P. crassipes Uhl. Riverton VIII, 17 (Van D).

P. amœnus Uhl. Riverton VIII, 21 (Jn); Lakehurst VII, 7 (Coll).

P. walshii Uhl. Lakehurst VII (Ds).

P. schwarzi Reut. (*confusus* Kirsch.) New Jersey (Uhl).

P. lætus Uhl. Jamesburg (Ds); Woodbine VIII, 21 (Van D).

ALEPIDIA Reut.

A. gracilis Uhl. Jamesburg (Ds).

FULVIUS Stal.

F. heidemanni Reut. (*anthocoroides* Uhl.) New Jersey (Uhl).

F. brunneus Prov. Jamesburg, the short-winged form (Ds).

RESTHENIA Spin.

R. insitiva Say. Del. Water Gap VII, 15 (Jn); Madison, rare (Pr).

R. insignis Say. Del. Water Gap VII, 8 (Jn); Madison, common (Pr); Staten Island VI, Jamesburg VII (Ds).

R. confraterna Uhl. Hewitt (Ds); Madison, rare (Pr).

R. nigricollis Reut. Jamesburg (Ds).

ONCEROMETOPUS Reut.

O. nigroclavus Reut. New Jersey (Uhl).

COLLARIA Prov.

C. oculata Reut. Staten Island VIII (Ds); Jamesburg VII, 15, Anglesea V, 28 (Coll).

STENODEMA Lap.

S. trispinosum Reut. Madison (Pr); Cranford VIII, Staten Island VII (Ds); Jamesburg VII, 15, Lahaway V, on cranberry bogs. This name replaces "*Brachytropis calcarata*" Fall., which is European, and not found in the United States.

- S. instabilis* Uhl. (*Miris*) Madison (Pr); New Brunswick, Jamesburg VIII, 15 (Coll); Riverton VIII, 21 (Jn).

TRIGONOTYLUS Fieb.

- T. uhleri* Reut. Staten Island VI (Ds); New Jersey (U S N M).
T. ruficornis Fall. New Jersey (Uhl).
T. pulcher Reut. Madison, common (Pr); Cape May VI, 22 (Jn).

MIRIS Fab.

- M. dolabratus* Linn. (*Leptoterna*) Madison (Pr); Staten Island (Ds); Orange Mts., New Brunswick, Jamesburg VI, 16, Mercer Co. VI, 23, Riverton VI, 25 (Coll).

PHYTOCORIS Fall.

- P. eximius* Reut. (*Paracalocoris inops* Say.) Madison (Pr); Staten Island VIII, Lakehurst (Ds); Jamesburg VIII, 10 (Coll).
P. tibialis Reut. Staten Island VIII (Ds); New Jersey (Uhl).
P. puella Reut. Madison, common (Pr); Staten Island VII, 10 (Ds); Lakehurst VII, 7, Anglesea VII, 12 (Coll).
P. brevisculus Reut. Riverton VIII, 17 (Van D).
P. pallidicornis Reut. New Jersey (Uhl).
P. annulicornis Reut. (*Campsocerochoris*) Lakehurst VII, 7 (Coll); New Jersey (Uhl).

PARACALOCORIS Dist.

- P. scrupeus* Say. (*Phytocoris*) Staten Island VI, Lakehurst (Ds); Mercer Co. VI, 24, Camden VI, 7 (Coll).
P. colon Say. Staten Island VIII (Ds); New Jersey (Heid).

NEUROCOLPUS Reut.

- N. nubilis* Say. Madison (Pr); New Brunswick VII, 7 (Coll); Staten Island VI, Lakehurst (Ds); Merchantville VI, 29 (Ss).

CALOCORIS Fieb.

- C. bipunctatus* Fab. Staten Island VI (Ds); Monmouth Co. (Uhl); Trenton VII, 2, Riverton VI, 25 (Coll).

ADELPHACORIS Reut.

- A. rapidus* Say. (*Calocoris*) Common everywhere VI-IX.

EUSTICTUS Reut.

- E. grossus* Uhl. (*Megacœlum*) Staten Island (Ds); New Jersey (Uhl).

STENOTUS Jakoleff.

S. binotatus Fab. (*Oncognathus*) Staten Island VI (Ds).

DICHROCYTUS Fieb.

D. suspectus Reut. (*rufipennis* Fall.) New Jersey (Uhler).

LYGUS Hahn.

L. pratensis Linn. (*oblineatus* Say.) Throughout the State all season; always abundant and sometimes injurious on garden crops.

L. invitus Say. Madison (Pr); Camden VI (Ss); Lahaway V, on cranberry bogs; not rare (Sm).

L. pabulinus Linn. Warren Co. VIII, 13 (Coll); New Jersey (Uhl).

L. vitticollis Reut. (*Monachus*) Chester VII, 20 (Dn); Jamesburg VII (Ds); Burlington Co. (Coll).

L. campestris Linn. (*Orthops pastinacæ.*) Palisades (Ds); New Jersey (Uhl).

L. flavonotatus Prov. Lakehurst VII, 7 (Coll).

L. rubicundus Fall. (*Hadrodema pulverulenta* Uhl.) Newark, Egg Harbor City (Uhl).



Fig. 69.—*Lygus pratensis*: adult at left; nymph at right; enlarged.

TROPIDOSTEPTES Uhl.

T. cardinalis Uhl. New Jersey (Uhl).

T. saxeus Dist. (*Neoborus*) New Brunswick VI, 9, on ash (Coll).

T. pettiti Uhl. (*Neoborus*) New Brunswick VI, 9 (Coll).

CAMPTOBROCHIS Fieb.

C. nebulosus Uhl. Madison (Pr); Staten Island IV, VI, VIII (Ds).

C. grandis Uhl. Staten Island VI, 8, Jamesburg (Ds); New Brunswick VIII, 8, Lahaway V, Lakehurst VII, 7 (Coll).

CAPSUS Fab.

C. ater Fab. Madison (Pr); Staten Island VI (Ds); New Jersey (Jn).

PŒCILOSCYTUS Fieb.

P. basalis Reut. Common everywhere VI–X, and sometimes seriously injurious to garden crops.

P. americanus Reut. (*Systratiotus*) Chester VII, 9 (Coll); Madison (Pr); Staten Island VI, Jamesburg (Ds).

P. venaticus Uhl. New Foundland (Ds).

PÆCILOCAPSUS Reut.

P. lineatus Fab. Throughout the State, all season; occasionally troublesome to small fruits and in gardens; sometimes to field crops.

HORCIAS Dist.

H. goniphorus Say. Madison (Pr); Hewitt, Newfoundland, Staten Island (Ds); New Jersey (div). This and the two next following have been removed from "*Pæcilocapsus*."

H. affinis Reut. Hewitt (Ds); Madison, rare (Pr).

H. marginalis Reut. New Jersey (Ss).

CACCOBAPHES Uhl.

C. sanguinarius Uhl. Staten Island VI, on red maple (Ds).

ORECTODERUS Uhl.

O. obliquus Uhl. United States generally (Uhl).

XENETUS Dist.

X. scutellatus Uhl. Newfoundland (Ds); Madison, rare (Pr).

PARAXENETUS Reut.

P. guttulatus Uhl. (*Eucercoris*) Madison (Pr); Riverton VIII, 17 (Van D); Lakehurst (Ds).

MONALOCORIS Dahlb.

M. filicis Linn. Madison (Pr); Staten Island VI, 9 (Ds); Jamesburg VII, 15 (Coll); Woodbine VIII, 21 (Van D).

PYCNODERES Guer.

P. dilatatus Reut. (*Eccritotarsus*) Throughout the eastern States.

SIXEONOTUS Reut.

S. insignis Reut. (*Eccritotarsus*) Jamesburg VII, 15 (Coll).

The following manuscript names of the previous edition are omitted: *Lopidea fuscicornis* Uhl., *Paracalocoris instabilis* Uhl., *Apocremnus robustus* Uhl., *Macrotylus blatchleyi* Uhl. and *Phylus modestus* Uhl. There seems to be some question as to the identity of *Bryocoris pteridis* Fall., and that name is also omitted as not representing a New Jersey species.

Super-family NOTONECTOIDEA.

Family ACANTHIIDÆ.

Replaces the term *Saldidæ* of the previous edition. They are small or medium size, usually blackish, and inhabit muddy banks or marshes, over or on which they fly or run rapidly. They are rather soft in texture, have a small head and prominent eyes, and some of them dig into the banks on which they are found. They are more or less predatory, feeding on living or dead insects, and none are of economic importance.

ACANTHIA Fab. (*Salda* Auct.)

- A. signoretii* Guer. Cape May VI, 22 (Jn), VIII, 19 (Van D).
- A. ligata* Say. Canada to North Carolina.
- A. confluenta* Say. Westfield VII, 3 (Bno).
- A. interstitialis* Say. Westfield VI, 11, VII, 16 (Bno).
- A. reperta* Uhl. Ft. Lee Dist. V, 28, Staten Island VII, 9 (Bno).
- A. deplanata* Uhl. Glen Ridge VI, 23 (Bno); Westville V, 2-VI, 22 (div).
- A. anthracina* Uhl. N. Y. and Pa., and certain to occur in New Jersey.
- A. sphacelata* Uhl. Atlantic City VIII, 20, Cape May VIII, 19 (Van D).
- A. coriacea* Uhl. Atco VI, 18 (Jn); Anglesea V, 28 (Coll).
- A. orbiculata* Uhl. On all sides of and probably in New Jersey.
- A. humilis* Say. Madison (Pr); Ft. Lee Dist. V, 28, Westfield VI, VII, Bloomfield VI, Staten Island VII, 9 (Bno).
- A. pallipes* Fab. Madison (Pr); Glen Ridge VI, 2, Westfield VI, VII, 9 (Bno).
- A. xanthochila* Fieb. Anglesea VIII, 23 (Van D).
- A. separata* Uhl. Pennsylvania and probably also New Jersey.
- A. lugubris* Say. In the adjacent States and probably also New Jersey.
- A. saltatoria* Linn. New York and probably New Jersey.
- A. vagator* Uhl. Anglesea (Ss); Cape May VIII, 19 (Van D).

Family OCHTERIDÆ.

Included under the "*Galgulidæ*"—now "*Nerthridæ*" of previous list, and resemble them in general appearance and habits.

OCHTERUS Latr. (*PELOGONUS* Latr.)

- O. americanus* Uhl. Westfield VII, 4 (Bno); Staten Island V, Lakehurst IX (Ds); Lahaway, on cranberry bogs V (Sm).

Family NERTHRIDÆ.

The Galgulidæ of the previous edition. They are broad, squat, with prominent eyes, often called "toad-bugs," because of a fancied resemblance to that animal. They are predatory, live in marshes and along the muddy banks of streams and, while not rare, are of no economic importance.

GELASTOCORIS Kirk. (GALGULUS Auct.)

- G. oculatus** Fab. Recorded from all parts of New Jersey, but all examined specimens are of an undescribed form (Bno).
G. n. sp. Bno. Staten Island VII (Ds); Lakehurst IX, 15 (Eng); Trenton VIII, 12, Anglesea V, 30 (Coll), and probably also the Caldwell, Riverton and Westville records of last edition.

Family NAUCORIDÆ.

Resemble the Nerthridæ in outline, but without the projecting eyes. They are predatory, the fore-legs are developed for grasping, and they live in water, crawling about among the plants. We have only a single species.

PELOCORIS Stal.

- P. femoratus** Pal. Beauv. Cranford VIII, 27 (Bno); Staten Island III, V, VIII, X, Jamesburg IX (Ds); Trenton VI, X, Delair IX, 1 (Coll); Riverton V, VIII (Jn); Camden IV, 17 (Ss).

Family BELOSTOMATIDÆ.

This family contains the "giant water bugs," oval, flattened creatures, with keel-like bodies beneath, short powerful beak, large fore-legs fitted for grasping, and long broad hind-legs fitted for swimming. At the anal extremity is a pair of short protrusible, strap-like appendages used for respiration.

They are predatory, feeding on all sorts of aquatic insects, tadpoles, and even fish, some of the species becoming two inches or more in length. At the mating season they fly from pond to pond at night, and at this time they are often attracted to electric lights in great numbers. This has given them the common name "electric light bugs," and their uncouth shape and sprawly motions make them objects of terror. As a matter of fact, they are quite harmless when carefully handled; but they are very strong, and in their struggles to get away will make use of their powerful legs. When they get a good chance they use their beak as well, and their puncture is extremely painful for a short time. It does not, however, produce any swelling or other ill effect.

BENACUS Stal.

- B. griseus** Say. Throughout the State in ponds and at electric lights; the largest of our species.

LETHOCERUS Mayr. (BELOSTOMA.)

- L. americanus** Leidy. Throughout the State at light, VII, VIII, in ponds all season; sometimes common and hardly smaller than the preceding.
- L. obscurus** Duf. With the preceding and usually confused with it, but less common.
- L. uhleri** Mont. Ft. Lee Dist. (Bt).

BELOSTOMA Latr. (ZAITHA A & S.)

- B. fluminea** Say. Throughout the State V-X. It is the commonest of the medium sized water bugs of this family.
- B. testaceum** Leidy. Delair (Coll).
- B. aurantiacum** Leidy. Riverton IX, 5 (Jp).

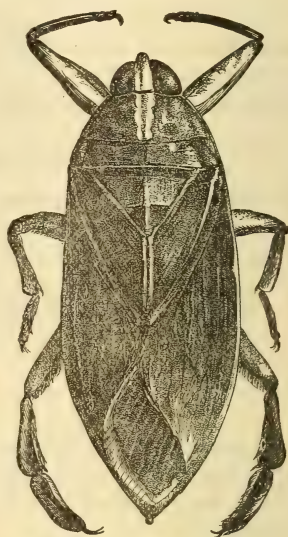


Fig. 70.—Giant water bug, *Lethocerus americanus*.

Family **CORIXIDÆ**.

These are the water-boatmen which inhabit almost every clean pond, permanent pool or sluggish stream. They are somewhat flattened above, have a broad short head and an exceedingly hot tongue. The species are predatory in habit, closely allied and not well determined in collections. Practically all that can be done under the circumstances is to give a list of those species that are so distributed that their occurrence in New Jersey is a reasonable certainty, adding the localities for such as have been determined with reasonable certainty.

ARCTOCORISA Wallen. (CORISA.)

- A. calva** Say. Caldwell (Cr); Jamesburg VI, 16 (Coll).
- A. tarsalis** Fieb. "Atlantic States" (Uhl).
- A. signata** Fieb. "Atlantic States" (Uhl).
- A. lateralis** Leach. (hieroglyphica Duf.) "Atlantic States" (Uhl).
- A. verticalis** Fieb. "Atlantic States" (Uhl).
- A. burmeisteri** Fieb. "Atlantic States" (Uhl).
- A. interrupta** Say. "United States" (Uhl).
- A. erichsonii** Leach. "Atlantic States" (Uhl).

- A. stagnalis* Leach. (*limitata* Fieb.) "Atlantic States" (Uhl).
- A. stigmatica* Fieb. "United States" (Uhl).
- A. alternata* Say. "United States" (Uhl).
- A. harrisii* Uhl. Madison (Pr).
- A. zimmermannii* Fieb. "United States" (Uhl).
- A. kennicottii* Uhl. "United States" (Uhl).
- A. suffusa* Uhl. New Jersey (Jn).
- A. serrulata* Uhl. New Jersey (Jn).
- A. expleta* Uhl. Lakewood VIII (Coll).

CALLICORIXA White.

- C. kollarii* Fieb. Canada to Florida.

Family NOTONECTIDÆ.

These are the "back-swimmers," so named because the upper surface is keeled, and they swim back-down. They are predatory, and "bite" severely if carelessly handled. Mr. Davis lists five species from Staten Island, and remarks that "they are most common in fall and spring, and pass the winter like so many other water bugs as adults." Mr. Bueno adds that "they can be caught, active, under the ice except in the coldest days of winter."

Sub-family NOTONECTINÆ.

NOTONECTA Linn.

- N. insulata* Kirby. Ft. Lee Dist. V, VIII, Staten Island VIII, IX, Delair (Bno); DaCosta VII (Jn).
- N. irrorata* Uhl. Piedmont Plain and northward all season, and probably throughout the State.
- N. undulata* Say. Throughout the State, our most common species, ranging in color variation from almost black to pure white.
- N. variabilis* Fieb. Piedmont Plain and northward throughout the season. Riverton VII, 12, VIII, 17 (div), and probably throughout the Delaware Valley region. "It is apt to be mistaken for a dwarf white *undulata*, and is the species appearing in the previous edition as *americana*."
- N. raleighi* Bno. Delair (Bno).
- N. uhleri* Kirk. Ft. Lee Dist. V, 5, 14 (Bno); Staten Island VIII (div).
The rarest of our species if not in the United States.



Fig. 71.—A water-boatman,
Notonecta species.

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BUENOA Kirk. (ANISOPS.)

- B. margaritacea** Bno. Staten Island IX-XI (Bno); Delair (Coll). This is the species usually in collections as "platycnemis" Fieb.
B. elegans Fieb. Ft. Lee Dist. IX, 7-X, 22, Rahway River, Cranford VIII, 27 (Bno).
B. platycnemis Fieb. Mount Holly VII, 18 (Coll); the true species (Bno).

Sub-family **PLEINÆ**.

PLEA Leach.

- P. striola** Fab. Cedar Lake (Ss); Trenton IV, 23 (Coll); Westfield VII, VIII, Cranford VIII, 27, Staten Island V, VI, IX (Bno).

Order DERMOPTERA.

The members of this little order are popularly known as "ear-wigs," from a supposed habit of crawling into the ears of persons sleeping outdoors. They are slender, with short wing-covers and resemble "rove-beetles" in shape, except for a forceps-like process at the end of the abdomen, used in tucking the large, elaborately plaited hind-wings under the wing-covers. The metamorphosis is incomplete, and the females of some species brood over their eggs until they are hatched.

Though the species are common and are said to be injurious in some European countries, they are rare in New Jersey and never troublesome in any way.

Family FORFICULIDÆ.

ANISOLABIA Fieb.

- A. maritima* Bon. Along the base of the Palisades north from Ft. Lee (Bt); Sandy Hook VII (Sm); g. d. along the seashore of Staten Island under stones and driftwood V, VI, IX, X (Ds). An introduced species.

LABIA Leach.

- L. minor* Linn. Caldwell (Cr); Staten Island V, VIII (Ds); New Brunswick VII, Englishtown X, 12, Lahaway IX (Sm). Another introduced species, flies commonly to light at times and may also be taken sweeping.

SPONGIPHORA Serv.

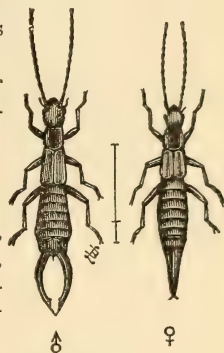
- S. brunneipennis* Serv. Has been recorded from New Jersey (Bt).

APTERYGIDA Westw.

- A. aculeata* Scudd. Snake Hill IV, V (Bt).

FORFICULA Linn.

- F. auricularia* Linn. The common European "ear-wig," which is occasionally found in green-houses on imported plants. Has never as yet been taken outdoors.



Forficula tæniata, male
and female.
Fig. 72.

Order ORTHOPTERA.

Contains the grasshoppers, katydids, roaches and crickets, by far the greater portion of which are feeders upon vegetation, and therefore actually or potentially injurious. Most of them feed openly upon the plant tissue and are therefore within reach of the stomach poisons.

In the species of this order the fore-wings are narrower and of firmer texture than the secondaries and serve as covers merely, not as organs of flight. The secondaries are folded more or less fanlike and are usually hidden by the primaries when at rest; the shape is in general triangular and the texture thin and membranous with numerous longitudinal veins, between which the tissue is reticulated. The metamorphosis is incomplete, and in some cases where the wings are wanting there is little difference in appearance between nymph and adult.

The list as it stands here has been revised by Mr. J. A. G. Rehn, of Philadelphia, who has collected extensively in New Jersey and is also a recognized authority in the order. In the list of 1900, while the collections were very good, it was, nevertheless, deemed expedient to include a number of species that seemed likely to occur though they had not been actually recorded. Since that time the collections made by Mr. Rehn and other Philadelphia collectors, by Mr. Davis on Staten Island and in eastern New Jersey generally, and by the office force in the State, have been so extensive that it is deemed proper to exclude nearly all species not actually taken. All the doubtful species have been verified and most of the college material has been in the hands of specialists in the various groups for study and determination.

Family BLATTIDÆ.

Better known as "roaches." They are more or less flattened, soft in texture, with long, slender antennæ or feelers and long, stout, spiny legs fitted for rapid running. They live in crevices, under bark or stones in the woods, or in cracks between boards and other hiding places in houses. Their favorite haunt in dwellings is about sinks or water pipes, whence a small brown, fully-winged form received in New York the name "Croton bug." A much larger species, in which the male has short wings and the female none at all, is known as the "black beetle." Both of these household pests are importations and have been spread by commerce over most of the civilized world.

In this family the eggs of the female are developed in an egg-case or oötheca which the mother carries about with her attached to the end of the abdomen until all the eggs are fully developed. She then drops it in some sheltered place, and, in due time, the case splits along one side and gives exit to the young, which resemble the adults throughout their life as nymphs.

None of the species are agriculturally important. In houses the domestic species are often extremely annoying and may be destroyed with

phosphorous paste or Paris green where there is no danger of poisoning children or household pets. A mixture of equal parts of sweet chocolate and borax ground together in a mortar and liberally spread about is attractive to the insects and rapidly fatal to them when eaten. Other foods should be kept out of the way so far as possible when this bait is spread. In any case specimens should be killed whenever seen, and a campaign very early in the season before the eggs are developed will avoid late summer trouble from the new brood.

BLATTELLA Caudell.

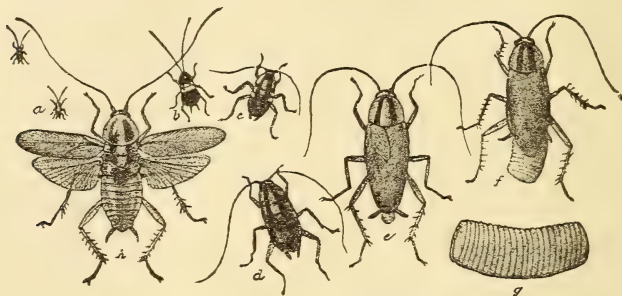


Fig. 73.—The Croton bug, *Blattella germanica*: a, minute nymphs just hatched; b, second; c, third; d, fourth stage; e, adult male, f, female with egg case attached; h, adult with wings spread—all natural size; g, egg case enlarged.

B. germanica Linn. The "croton bug" or small "cockroach," common in houses in cities and towns throughout the State. It is purely domestic, never found out-doors, and there are yet a few places in the State in which the species is unknown. Was referred to *Phyllodromia* in last edition. The "*P. borealis*" of that list is the female of "*Ischnoptera pennsylvanica*."

ISCHNOPTERA Burm.

- I. pennsylvanica** De G. Throughout the State, under bark and attracted to "sugar"; mature in V-VII; recorded by all collectors. The "*Phyllodromia borealis*" of the last edition is the female of this species.
- I. uhleriana** Sauss. Represented from every section of the State and taken in every month from V-X; locally common. Is attracted to light and "sugar," and also occurs under bark. The "*I. unicolor*" of the last edition is this same species, and "*Temnopteryx virginica*" is the female.
- I. johnsoni** Rehn. Haddonfield II, 2 (Cope). A southern species (Rehn).

BLATTA Linn. (STYLOPIGA Fischer.)

- B. orientalis** Linn. The "oriental roach" or "black beetle." Occurs in houses throughout the State; more common in the cities and towns than in the farm houses.

PERIPLANETA Burm.

P. americana Linn. Throughout the State, rarely common in my experience. Mr. Davis notes it "in green-houses and other like situations, where it is warm and moist." In one case, in Camden, it was found infesting a feed store-house so abundantly that two quarts were captured in a single night.

PANCHLORA Burm.

P. poeyi Sauss. (*viridis* Burm.) Staten Island, one specimen found in March in a closet where bananas had been kept (Ds). This species, its ally "*P. exoleta*," "*Periplaneta australasica*," "*Nyctibora mexicana*" and "*Leucophæa surinamensis*," are not natives of New Jersey and not really a part of its fauna. Their occurrence is accidental, merely coming in with material imported from the tropics, and the species do not maintain themselves in the State.

Family MANTIDÆ.

Of these very peculiar insects we have only one native species, which is taken rarely in the southern section. There is another which has been intentionally introduced, and this has now established itself at several points. They have a very long, narrow prothorax and immensely developed fore-legs, which they use in holding or grasping their prey, for they are carnivorous. The other legs are feebly developed and the body is clumsy. The eggs are laid in masses on twigs, and are covered by a fibrous substance, which holds them together. The native species is too rare to be of any economic value, and up to the present time that is also true of the introduced species.

STAGMOMANTIS Sauss.

S. carolina Johann. Has been taken in Atlantic and Ocean Counties.

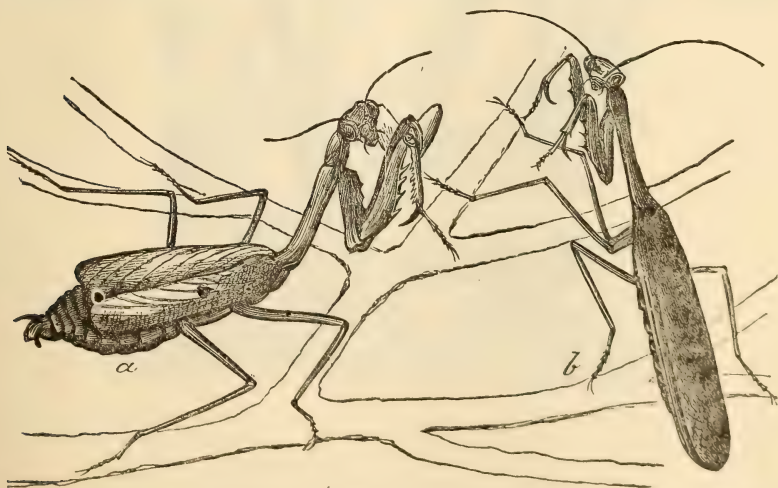


Fig. 74.—*Stagmomantis carolina*: a, female; b, male; natural size.

The "*S. dimidiata*" Burm., is omitted as unlikely to occur.



Fig. 75.—Walking stick, *Diaperomera femorata*: a, b, eggs, enlarged, front and side view; c, young just hatching; d, male; e, female adult.

PARATENODERA Rehn.

P. sinensis Sauss. Accidentally introduced at Philadelphia from the Orient, from which parent colony many others have been started, intentionally or otherwise. Egg masses were distributed to numerous localities throughout the State, and the insects have been found since at Rutherford, Elizabeth, New Brunswick, Staten Island, Moorestown, Woodbine, Atlantic City and Anglesea. Nowhere have they done so well as at the point of original introduction.

Family PHASMODÆ.

These are the "walking sticks"; odd creatures, two inches or more in length, very slender, with very long antennæ and long, slender legs, which they so dispose as to be practically invisible when at rest to all save the trained eye. No wings are developed in our species, which, while it occurs quite generally, and sometimes even abundantly, is never injurious. It feeds on the foliage of a variety of shrubs and trees, and the eggs are simply dropped to the ground at random by the female on the plants.

DIAPHEROMERA Gray.

D. femorata Say. Throughout the State, becoming adult VIII and IX, but found until X. Usually rare, but sometimes locally rather plentiful. I have had them reported so in Somerset County on peach trees. Mr. Davis writes that it is "partial to hazel bushes and young chestnut, but found on many other plants. It is not common on the Island, which is probably due to the fact that its eggs lie on the ground over winter and are destroyed by the oft burning of the woodland."

Family ACRIDIIDÆ.

These are the short-horned grasshoppers, perhaps the most common

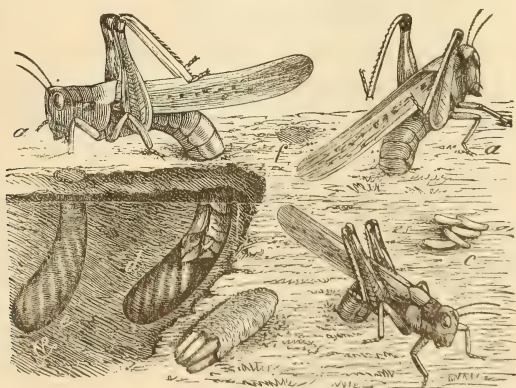


Fig. 76.—Illustrates egg-laying of a grasshopper: *a, a*, females with abdomen inserted in the soil; *b*, broken egg-pod lying on surface; *c*, individual eggs; *d*, section of soil showing eggs being placed in position; *e*, egg-pod completed; *f*, egg-pod sealed over.

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and best known of our insects, jumping or flying up however one turns, among grass or low herbage in roads, fields or meadows. The females have at the end of the abdomen four horny valves, by means of which they lay their eggs in masses in the ground or in soft decaying wood, where they may remain all winter or may hatch in fall. In the latter case the partly grown larvæ winter and are sometimes seen on mild days even on the snow. The hind legs are much the longest, developed for jumping, the antennæ rarely exceeding and often not equalling half the length of the body.

Among the grasshoppers are many injurious species, which in some countries take the form of devastating plagues. In New Jersey the insects are usually held in check by their natural enemies, and only in unusually dry seasons do they become at all troublesome to cultivated crops. In such cases the arsenites may be used and sometimes the bran and Paris green as used for cut-worms proves very satisfactory. Instead of bran, fresh horse manure can be used. The grasshoppers are very fond of that and will eat it in preference to almost anything else.

Turkeys and guinea fowl are very active feeders on grasshoppers, and will keep them down whenever allowed to range freely over infested fields.

NOMOTETTIX Morse.

N. cristatus Scudd. Throughout the pine barren IV-X, found in pine and oak wood undergrowth. Is less abundant further north, but Mr. Davis reports it at Little Falls VI, Great Notch V, Newfoundland VII and Lake Hopatcong VII. It therefore occurs throughout the State. Belongs to the little series of "grouse locusts."

N. carinatus Scudd. Occurs with and is sometimes considered a long-winged form of the preceding.

N. sinuifrons Hancock. Lakehurst V (Rehn).

ACRYDIUM Geoff. (TETTIX Fischer.)

A. granulatum Kirby. Newfoundland V, VII, Staten Island IV, X (Ds); Camden County (Ss). The form "triangularis" Scudd. occurs with the type.

A. obscurum Hancock. "New Jersey" (PAS); Belvidere IX (Long); Riverton V (Dke); Clementon VI, Malaga VIII (GG); Stafford's Forge IX (Hebard).

A. arenosum Burm. Husted V, Ocean Co. V (Coll); Staten Island IV-VII, X (Ds).

NEOTETTIX Hancock.

N. femoratus Scudd. Staten Island VI, VIII, Brookville VII, Jamesburg VII, Lakehurst VII (Ds)

PARATETTIX Bolivar.

P. cucullatus Burm. Delaware Water Gap VII (div); Boonton I, 10, nymphs (Greene); Glassboro IX, 19 (Jn); Iona V, 26 (Dke).

TETTIGIDEA Scudd.

- T. parvipennis* Harr. From all points south of the Piedmont Plain, in every month from March to October. It is reported by all contributors, the only northern records being Great Notch V, Palisades VIII, and Staten Island IV-VII and X (Ds). Mr. Rehn says that "the range of this species overlaps that of the next (*lateralis*) of which it appears to be a northern representative." The "polymorpha" Burm. of the last edition referred to this species.
- T. lateralis* Say. Covers the same territory as the preceding, but the records are not so numerous and there are none north of Staten Island.
- T. pennata* Morse. Greenwood Lake V, Newfoundland V, Staten Island IV-VI, IX, Lakehurst V, VI (Ds); Chester III, Newark III, Princeton III, Lahaway V, IX, Anglesea V, IX (Coll).
- T. acuta* Morse. Staten Island IV (Ds).
- T. armata* form *depressa* Morse. "New Jersey" (PAS) fide Rehn.
- T. davisii* Morse. Staten Island IV, VI, VIII, Perth Amboy V, 31, Jamesburg VIII, 31 (Ds).
- T. prorsa* Scudd. Beach Haven, spring (Long); not previously known north of Georgia. Ends the series of grouse-locusts.

TRUXALIS Fabr.

- T. brevicornis* Johann. Jamesburg VII, 4 (Jn); Delair IX, Anglesea IX (Coll); Lucaston IX (Dke); Cold Spring IX (Long); West Creek IX (Rehn); Almonessen IX (W); Dennisville IX (Ds). Is an inhabitant of both fresh and salt marsh areas, but more abundant in the latter.

MERMIRA Stal.

- M. vigilans* Scudd. Anglesea, Cape May, Ocean City in September; recorded by several collectors and sometimes common. Mr. Rehn says that this name must replace "*bivittata*" Serv., which represents a species that does not occur in New Jersey.

SYRBULA Stal.

- S. admirabilis* Uhl. Throughout the pine barrens, especially at the edge of the maritime, extending a little into the Delaware Valley region, VIII-X. "A species found in low scrubby growth such as in overgrown clearings and occasionally on cranberry bogs."

ERITETTIX Bruner.

- E. carinatus* Scudd. "No evidence yet of its occurrence, but no doubt will be found from the red shale belt north" (Rehn). Mr. Rehn does not believe that "*Amblytropidia occidentalis*" Sauss. will occur in New Jersey. He says that it is restricted to the Georgia pine regions

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(*P. palustris*), and that the Canadian record for the species is almost certainly based on a misidentification.

ORPHULELLA Giglio-Tos.

- O. *speciosa* Scudd. Sparta, Staten Island VII-IX (Ds); Orange Mts. VII, VIII, Bound Brook VIII, Sandy Hook, Jamesburg on cranberry bogs, Lakehurst VIII (Coll); Ft. Lee (Bt); Anglesea IX, 4 (Rehn). The names "*æqualis*" Scudd., and "*bilineata*" Scudd., refer to this same species according to Rehn.
- O. *olivacea* Morse. From Sandy Hook to Cape May along the seashore. Occurs on the salt marsh chiefly, rarely extending inland a little to old fields near the marshes, VIII and IX.
- O. *pelidna* Burm. Extends along the coast from Staten Island to Cape May, through the pine barrens where it is common on cranberry bogs, is rarer and less generally distributed in the Delaware Valley region and extends along the Hudson to Fort Lee. I have no records from the Piedmont Plain and northward. Mr. Rehn says it occurs usually on wet meadows, but occasionally in scrub land, dry woods and grassy waste fields from July until frost. As far as known not found in salt marshes, but occasionally taken on the beaches. Mr. Rehn also says that "*maculipennis*" Scudd. is undoubtedly this same thing.

CLINOCEPHALUS Morse.

- C. *elegans* Morse. Ocean County on cranberry bogs, rare (Sm); West Creek IX, 3 (Rehn); Ocean View VIII, 11 (Fox); Anglesea IX, 5 (W); Cape May IX (div). Generally found in salt meadows on grassy places in the salt marsh (Rehn).

DICHROMORPHA Morse.

- D. *viridis* Scudd. Occurs throughout the State, but much more generally south of the Piedmont Plain, from July until frost. Occurs in dry grassy fields, meadows and hillsides, and also on the dams and dry cranberry bogs in Ocean and Monmouth Counties. The variety "*punctulata*" Scudd. occurs with this type.

CHLOEALTIS Harr.

- C. *conspersa* Harr. Lake Hopatcong, Culvers Lake, Newfoundland, Sparta, Staten Island, Lakehurst, Tuckerton (Ds); Ft. Lee (Bt); Browns Mills Jn. (Dke); Speedwell, Atsion (Rehn), July until frost. Mr. Rehn adds that this is a very scarce species in South Jersey, and there found in boggy spots and on wet ground.

CHORTHIPPUS Fieb. (STENOBOTHRUS Fischer.)

- C. *curtipennis* Harr. Lake Hopatcong, Sparta, Little Falls, Staten Island VII-X (Ds); Orange Mts., Jamesburg, Ocean Co. VIII (Sm); Cald-

well (Cr); Anglesea IX (Rehn). A northern species, which apparently works south along the coast (Rehn).

MECOSTETHUS Fieb.

- M. lineatus* Scudd. Ft. Lee VII, 31 (Bt); Hammonton VII, Anglesea IX, Ocean County on cranberry bog IX (Coll); Lakehurst VII (Ds). A very pretty and rare species, taken only in single specimens. The "*M. gracilis*" of the previous edition is based on an erroneous determination.

ARPHIA Stal.

- A. sulphurea* Fabr. Occurs throughout the State, but more common south of the Piedmont Plain IV-VII. Found in waste places along the edge of woods (Rehn), and also about cranberry bogs.
- A. xanthoptera* Burm. Common south of Piedmont Plain VIII-X, "on waste, grassy and sandy fields, woodland roads and along the edges of woods (Rehn). North of that point it occurs more rarely at Fort Lee (Bt); Orange Mts. and Middlesex Co. (Coll); Staten Island VIII-X (Ds).

CHORTOPHAGA Sauss.

- C. viridifasciata* De G. Throughout the State, generally common, and throughout the season. The nymphs winter as such and often become active and noticeable during warm periods and in early spring. Adults are recorded in every month from May to October. The varieties "*virginiana*" Fabr., "*radiata*" Harr., and "*infuscata*" Harr., occur with the type form.

ENCOPTOLOPHUS Scudd.

- E. sordidus* Burm. Newfoundland IX, Staten Island IX-XI (Ds); Caldwell (Cr); Newark, New Brunswick, Ocean Co. X (Coll); Speedwell VIII, 31 (Stone).

HIPPISCUS Sauss.

- H. phœnicopterus* Germ. Throughout the pine barrens VI-VIII and extends a little into the Delaware Valley area. Also recorded from Little Falls (Dke); Caldwell (Cr) and New Brunswick (Coll), but rarely. "Found in sandy, over-grown fields and oak scrub barrens" (Rehn).
- H. rugosus* Scudd. Caldwell (Cr); Bound Brook VIII, Lahaway VII, Lakewood, Anglesea VI (Coll); Cedar Grove VII, South Seaville VIII, Dennisville VIII, Ocean View VIII (Fox); old fields edges of woods and woodland roads (Rehn).
- H. compactus* Scudd. Orange Mts., Bound Brook, New Brunswick, all VIII (Coll). Mr. Rehn thinks these may be specimens of "*rugosus*"; they were named by Prof. Bruner.

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- H. tuberculatus* Beauv. Hewitt VI, Newfoundland VII, Great Notch V, Staten Island V-VII (Ds); High Bridge V (Ss); Farmingdale VII, 15 (Jn).

DISSOSTEIRA Scudd.

- D. carolina* Linn. Common throughout the State VII-XI; the most abundant and conspicuous of the larger species.

SPHARAGEMON Scudd.

- S. bollii* Scudd. (*balteatum* Scudd.) Throughout the State VII-X, but much the most abundant in the pine barrens. Found in "sandy fields, edges of woods, woodland roads and beneath undergrowth in oak and pine woods and in scrubby clearings" (Rehn).
S. saxatile Morse. Newfoundland VII-IX, on rocky ridges (Ds).
S. collare-wyomingianum Thos. = *æquale* Scudd. = *collare* Scudd. of the last edition. Staten Island VII-XI (Ds), and throughout the pine barrens. Occurs at Jamesburg and elsewhere on cranberry bogs and is locally abundant.

SCIRTETTICA Sauss.

- S. marmorata* Harr. Throughout the pine barrens and extending into the adjacent regions a short distance VII-X, and locally common. "A species found on exposed sandy spots, roads or fields, in low, open scrub, woodland paths and roads and in dry oak, pine and hickory woods" (Rehn).

PSINIDIA Stal.

- P. fenestralis* Serv. Staten Island VII-IX (Ds); extends southward through the pine region to Cape May and into the Delaware Valley region to Westville and Riverton. Occurs on sandy meadows and scrub land near beaches and in open places in pine woods; recorded by all collectors and as late as X, 11.

TRIMEROTROPIS Stal.

- T. maritima* Harr. Along the shore from Staten Island and Sandy Hook to Cape May and up the Delaware Bay to Bayside VI-X. Almost exclusively a beach species, rarely found in sand-pits marking old beaches, some distance inland: e. g., Sea Isle Junction IX (Fox); Lakehurst VII-IX (Ds); Mt. Pleasant IX on sandy road (Fox).

CIRCOTETTIX Scudd.

- C. verruculatus* Kirby. Del. Water Gap VII-IX (div); Dover VII, 15 (Jn).

PSEUDOPOMALA Morse.

- P. brachyptera* Scudd. New Jersey (Ss); Ft. Lee VII (Bt).

SCHISTOCERCA Stal.

S. alutacea Harr. Extends throughout the State south of the Piedmont Plain; most common in the pine barrens VII-IX; also Staten Island VIII-X (Ds); Middlesex Co. VIII (Sm).

According to Rehn this species occurs in two color-phases, which include the "obscura" Burm. and "rubiginosa" Harr. of the previous list. It is found in dry oak scrub, the undergrowth of pine woods, on bogs and near swamp land. It is sometimes abundant about and on weedy cranberry bogs and is occasionally accused of feeding on berries.

S. americana Dru. Ft. Lee (Bt); Newark (Ang); Staten Island V, VI, VIII, X-XII (Ds); Lahaway VII, Lakewood VIII, Anglesea VIII (Coll); Seaside Park IX (Long); Cape May VII, VIII (div). Our largest grasshopper, with very long wings and powerful flight, whence it is termed the "bird locust."

S. damnifica Sauss. Westville V (Sk); Woodbury VIII (Vk); Clementon IV, V (div); Florence IV (C); Lucaston X, Hammonton IX, Manumuskine VI (Dke); Medford IX (Stone); Speedwell VI, Staffords Forge XI (Rehn); Lakehurst IV, V, Lakewood XI, Manasquan IX (Ds). "One of our earliest and also one of our latest grasshoppers, appearing IV-XI, frequenting pine woods undergrowth and dry grass lands" (Rehn).

HESPEROTETTIX Scudd.

H. brevipennis Thos. Lakehurst VIII (Ds); Stafford's Forge VIII-X (Rehn); Mt. Pleasant IX (Fox); Anglesea VIII (Coll). "Not uncommon in the cranberry fields of Atlantic County" (Uhler).

DENDROTETTIX Riley.

D. quercus Riley. Bamber VIII, 17 (Dke). This is the only record of the species in the eastern United States (Rehn).

MELANOPLUS Stal.

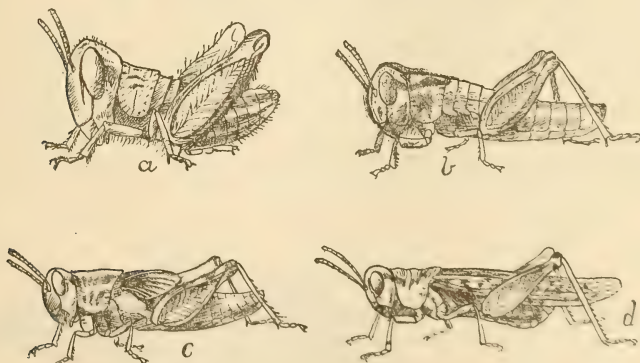


Fig. 77.—The stages of a grasshopper: a, young nymph; b, nymph further advanced; c, pupa; d, winged adult.

M. atlanis Riley. More or less common throughout the State in grassy areas and along roads, VII to frost.

- M. mancus* Sm. Lake Hopatcong (Ds. Sleight).
- M. impudicus* Scudd. Jamesburg, East Plain, Lakehurst, all VII (Ds); Atsion IX, White Horse VIII, near Harris VIII (Rehn); Stafford's Forge IX (Hebard). A southern species found only in the undergrowth of pine woods (Rehn).
- M. scudleri* Uhler. Hopatcong VIII, Newfoundland IX, Staten Island VIII-XII, Lakehurst IX, X (Ds); Middlesex Co., Atlantic Co. (Coll); Riverton IX (Jn); Almonessen IX (W); Medford VIII Atsion IX, X, DaCosta VII, Stafford's Forge IX, XI (Rehn); Lucaston IX (Dke); Mt. Pleasant IX (H. Fox).
- M. fasciatus* Wlk. Jamesburg, on cranberry bogs VII, VIII (Bt); White Horse VIII, Stafford's Forge VIII, IX, Speedwell VIII, Cedar Grove IX, Whittings IX (Rehn); DaCosta VII, Manumuskin (Dke). This species is usually encountered in the undergrowth of pine wood (Rehn).
- M. femur-rubrum* De G. The commonest of our field grasshoppers, occurring throughout the State and practically throughout the season. Mr. Rehn adds, however, that in the pine barrens it is only found in cultivated areas and abandoned fields.
- M. tribulus* Morse. Staten Island VII, IX (Ds); Stafford's Forge VIII (Rehn).
- M. stonei* Rehn. Between Harris and White Horse VIII (Stone & Rehn); Atsion IX, 2, Stafford's Forge VIII, 26 (Rehn). This striking species has been taken in the low scrub under mixed pine and oak and on bare sand near pine woods.
- M. minor* Scudd. Along the Palisades in dry, grassy places VI, VII (Bt); Jamesburg VI, Lakehurst VI (Ds); Westville VI (Jn); Atco (Ss); Speedwell VI, 20 (Rehn); Clementon VI, 6 (Long).
- M. luridus* Dodge. (*collinus* Scudd.) From all sections of the State except the maritime, VII-IX. It is one of those species occurring on and around cranberry bogs. Mr. Beutenmuller marks it from dry, grassy places, and Mr. Rehn says it is found in dry woods on bare spots, sandy fields, in huckleberry barrens or in undergrowth.
- M. keeleri* Thos. Stafford's Forge VIII, White Horse VIII (Rehn); Sumner X, 15 (Long). A southern species found in the undergrowth in pine woods. "Only known as a New Jersey species on the basis of females. When compared with females from Florida, Georgia and North Carolina, they are identical. According to Morse, '*M. luridus*' and this species run into one another, at least in portions of their ranges. This may be the case, but in New Jersey '*luridus*' appears to be a smaller form than the southern type called '*keeleri*'" (Rehn).
- M. differentialis* Thos. Camden (div); Riverton X, 11 (Rehn); Westville IX, 12 (Jn); Dennisville IX (Ds).
- M. femoratus* Burm. (*bivittatus* Say.) Common throughout most sections of the State VII-X. The clumsiest species of this genus, and sometimes abundant on grassy cranberry bogs.

M. punctulatus Scudd. Newfoundland IX, Staten Island VIII, IX, Lakehurst VIII-X (Ds); Stafford's Forge IX (Hebard); Brown's Mills X (Dke); Ocean County, about cranberry bogs (Sm).

PAROXYA Scudd.

P. floridiana Scudd. Throughout the pine barrens, extending along the shore into the coastal strip, and on the west into the Delaware Valley fauna. Have no records from the Piedmont Plain, but Mr. Davis finds it on Staten Island VIII-IX. It is one of the species on and near cranberry bogs, and the records under "atlantica" Scudd. in the previous edition belong here.

P. scudderi Blatchley. Jamesburg VIII-IX, Lakehurst VII-X (Ds); Atsion X (Hebard); Speedwell VIII, Stafford's Forge VIII, IX (div); Bear Swamp VIII (Rehn). More of a strictly pine barren species than the preceding, and also sometimes on cranberry bogs (Rehn).

Family LOCUSTIDÆ.

These are the long-horned or meadow grasshoppers and the katydids, which are generally more or less obviously green in color. The antennæ are thread-like, always as long, and often two or three times as long, as the body. The hind legs, also formed for leaping, are much longer and proportionately more slender than in the Acridiidae, the entire insects indeed being less robust in build. In the females the ovipositor is prolonged into a blade made up of six flat pieces, the whole sometimes straight, sometimes curved or sickle-shaped. In the males the wing-covers overlap at the base and are modified into a sound-producing organ, by means of which they produce either a shrill continuous call, or a chirping or rasping, which is characteristic for each species, so that, after some experience, they may be recognized by this character alone. Although only the males are musicians, both sexes are provided with ears in the tibiae of the anterior legs. The head in most of the species is pointed, and the mouth parts are well developed, the mandibles being especially long and sharp pointed. This makes it possible for them to dig into tissue or to eat seeds, as many do, of grasses and other plants. Several species occur on cranberry bogs, and some eat into the berries to get at the seeds, species of "Scudderia" being the principal offenders.



Fig. 78.--A species of *Microcentrum*.

The members of this family winter chiefly in the egg stage, the eggs being laid in grasses, reeds, stems of plants, bark of trees, and even in the leaves between the upper and lower layers, the blade or sword-like ovipositor being especially adapted for this purpose. In one group the eggs are laid externally on edge, in a series partly overlapping each other. This habit makes it possible to control the species feeding on the cranberry bogs, because these lay their eggs in certain grasses on the dams and around the edges. If these dams and edges be burnt off in the winter to destroy all grasses, the insects will not appear in troublesome numbers the season following.

We have a few forms that are wingless and live in cellars, caves and dark places generally, but these are usually rare.

SCUDDERIA Stal.

- S. texensis* S & P. Hewitt VII, Little Rock VIII, IX, Staten Island VIII, IX, Jamesburg VIII (Ds) and throughout South Jersey, especially in the pine barrens. This is the species referred to as "furculata" in the last edition, which is so troublesome on cranberry bogs, and does such serious injury to the fruits. It occurs to the very edge of the maritime, but gets very little into the Delaware Valley region.
- S. pistillata* Bruner. Chester VIII, 7 (Coll); Lucaston IX (Dke); "New Jersey" (Ss); occurs with the other species VIII, IX (Bt).
- S. curvicauda* De G. (*angustifolia* Harr.) Caldwell (Cr); Riverton VIII (Vk) and throughout the pine barrens; less abundant than "texensis."
- S. furcata* Bruner. (*fasciata* Beut.) More widely distributed than any other species, extending into the highlands and Piedmont Plain, but less abundant there than in the pine barrens or even the Delaware Valley region. The specimens are found on cranberry bogs, and also in oak barrens and the undergrowth of pine woods.
- S. septentrionalis* Serv. Ramsey VIII, 9, Lake Hopatcong VII, VIII (Sleight); Vineland, Hy. Edwards (Bt).
- S. truncata* Beut. Vineland (Bt).

AMBLYCORYPHA Stal.

- A. oblongifolia* De G. From the Orange Mts., southward through the Piedmont Plain, the Delaware Valley and the pine barren region VII to frost. This species tends to the production of pink or brownish individuals.
- A. rotundifolia* Scudd. Sparta, Newfoundland IX, Ft. Lee VIII, Staten Island VII-frost, Morgan X, Lakehurst VII (Ds); Chester VIII, IX Ocean Co. (Coll); Manumuskin X, Weymouth VII (Dke); Stafford's Forge VIII (Rehn); Sea Isle Jn. (H. Fox); found in oak scrub and old fields (Rehn).
- A. uhleri* Bruner. Atsion X (Hebard), Lucaston IX (Dke); Sea Isle Jn. IX (H. Fox); in shrubby fields.

MICROCENTRUM Scudd.

- M. rhombifolium** Saus. Staten Island VIII to frost; Dennisville IX, Tuckerton VIII, IX (Ds); Delair, Lucaston IX (Dke); Stafford's Forge VIII, IX (div); Malaga IX (G G). This name replaces "laurifolium" Linn. of the last edition. Common at New Brunswick IX and X, and occurs throughout the State. This is the species whose eggs are sent in so frequently and which are shown at Fig. 80.
- M. retinerve** Burm. Mt. Holly VIII, 18 (Haim); Manumuskin X (Dke); Bayside X, 21, Cape May IX, 23 (Coll). This is the more southern form, and the remarks under this species in the last edition refer to the preceding.

PTEROPHYLLA Kirby.

- P. perspicillata** Linn. Replaces "Cyrtophyllus concavus" Harr. of the previous list for the common katydid, which occurs throughout the State from late July until frost. Mr. Davis has noted July 22, 28, 29 for three separate years as the date of the first katydid call. The species is much more abundant in the northern than in the southern portion of the State, and its loud song forms a distinct feature of the August nights in some wooded regions.

CONOCEPHALOIDES Perkins.

- C. robustus** Scudd. Hackensack Meadows (Bt); Staten Island VIII until frost. Along the coast from Barnegat Bay southward, taken in the sedgy areas at the edges of the salt marsh. Also found in swampy areas at Jamesburg and throughout the pine barrens late VIII-X.
- C. triops** Linn. (dissimilis Serv.) Ft. Lee VIII, IX (Bt); Staten Island VIII-frost, Lakehurst IX, Cape May IX (Ds); New Brunswick IX (Gr); Trenton X, Lahaway X (Coll); Riverton IX (Vk); Westville IX (Jn); Merchantville X, Lucaston IX (Dke); Sewell X, 6 (Dn); Sea Isle City IX (Haim).
- C. ensiger** Harr. Greenwood Lake VII, Staten Island VII-frost, Jamesburg IX (Ds); Ft. Lee VII-frost (Bt); New Brunswick VIII (Coll); Manumuskin VIII (Dke).
- C. retusus** Scudd. Caldwell (Cr). Not satisfactorily recognized in our collections.
- C. atlanticus** Bruner. Staten Island IX, Lakehurst IX (Ds); Westville IX (Jn); Delair VIII, Anglesea IX (Dke); Atsion X (Hebard).
- C. exiliscanorus** Davis. Staten Island VII-frost; in salt meadows on "Spartina," Farmingdale VIII, Dennisville IX, Freneau VIII, 21, (Ds); Hackensack Meadows (Bt).
- C. lyristes** Rehn. & Hebard. Snake Hill VIII, Staten Island VIII, Lakehurst IX, Dennisville IX, Tuckerton IX (Ds); Barnegat Bay Dist. X (Coll); Stafford's Forge IX (Hebard); Speedwell VIII (Stone); Cape May VII, IX (div).
- C. caudellianus** Davis. Jamesburg IX, Lakehurst IX, Tuckerton VIII, IX (Ds).

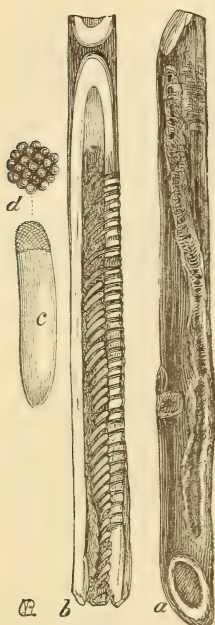


Fig. 84.



Fig. 81.



Fig. 82.



Fig. 80.



Fig. 79.



Fig. 83.

- Fig. 79.—The true Katydid, showing the stridulating area at base of forewings.
 Fig. 80.—Eggs of *Microcentrum*; *a*, from the front; *b*, from side.
 Fig. 81.—Field cricket, male and female.
 Fig. 82.—Tree cricket, male, from above.
 Fig. 83.—Tree cricket, female, from side.
 Fig. 84.—Eggs of tree cricket in raspberry cane; *a*, appearance of the punctures from without; *b*, cane split to show eggs in position; *c*, individual egg greatly enlarged.

- C. nebrascensis* Bruner. Lakehurst IX, 20 (Ds); Sea Isle City IX, 19 (Haim); Cold Spring, Cape May Co. IX, 14 (Long).
- C. palustris* Blatchley. New Brunswick IX (Coll); Dennisville IX (Ds). The "*C. gladiator* Redt." of the previous edition has not been verified and is omitted.

ORCHELIMUM Serv.

- O. agile* DeG. Westville VIII (Vk); Delair X, Lucaston IX (Dke); Sea Isle City IX (Haim); Dennisville IX (Ds); Anglesea VIII, IX (Coll); Cape May IX (div).
- O. glaberrimum* Burm. Ft. Lee Dist. (Bt); Anglesea IX, 5 (W).
- O. vulgare* Harr. (*gracile* Harr.) Throughout the State from all points south of the highlands, late July until frost. Occurs in low, swampy meadows and in marshes, salt and fresh, to the edge of the seashore. Common on grassy cranberry bogs.
- O. erythrocephalum* Davis. Helmetta IX, Jamesburg IX, Lakehurst VII-X, Toms River VIII, Tuckerton IX (Ds); New Lisbon IX, Lahaway IX (Sm); Browns Mills Jn. VIII (Dke); Great Cedar Swamps VIII (H. Fox).
- O. herbaceum* Serv. (*concinnum* Scudd.) Staten Island VII-X, Brookville VII, Dennisville IX (Ds); DaCosta VII (Dke); Speedwell VIII (Stone); Spray Beach IX (Long); Atlantic City IX (Rehn); Anglesea IX (W).
- O. validum* Wlk. (*nigripes* Scudd.) Riverton IX (div); Lucaston IX, Belleplain IX (Dke); Gloucester X (Hardenberg); Clementon IX (G G); West Creek IX (Rehn); Sea Isle City IX (Haim).
- O. pulchellum* Davis. Helmetta IX, Dennisville IX (Ds); Trenton IX, X (Gr); Clementon X (Rehn); found in swamps.
- O. campestre* Blatchley. Tuckerton VIII, Cape May VIII (Dke).
- O. minor* Bruner. Helmetta IX, Jamesburg IX, Lakehurst VII-X, on pine, often in tops of the trees (Ds); Browns Mills Jn. X (Dke); Atsion X, Staffords Forge IX (Hebard); Delair IX (Coll).
- O. indianense* Blatchley. Sea Isle City IX, 12 (Haim); Ocean View VII, 30, VIII (H. Fox); a salt marsh species in New Jersey (Rehn).
- O. fidicinium* Rehn & Heb. Staten Island VIII, Tuckerton VIII, IX (Ds); Ocean View VIII, Townsends Inlet VIII (H. Fox); Anglesea IX, 9 (Rehn). Apparently restricted to salt marsh areas.

CONOCEPHALUS Thunb. (XIPHIDIUM.)

- C. fasciatus* De G. South of the Piedmont Plain, common in fresh-water swamps from July until frost. Extends northward along the Hudson and along the Hackensack Valley, and taken in the swamps near Trenton, else there are no records from the Piedmont Plain or northward. This is one of the cranberry bog species.

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- C. brevipenne** Scudd. Occurs with the preceding, quite as common and more widely distributed; extends north to Hopatcong (Ds) and is recorded throughout the Delaware Valley region. Also occurs on cranberry bogs.
- C. ensiferus** Scudd. Staten Island VIII; may be a large form of "brevipenne" (Ds).
- C. saltans** Scudd. Riverton IX, 8 (Vk); Atsion X (Hebard); Browns Mills Jn. X (Dke).
- C. strictum** Scudd. Staten Island IX, X (Ds); Taunton IX (Stone); Atsion X (Hebard).
- C. nemorale** Scudd. Along the eastern slope of the Palisades VIII, IX (Bt).

ATLANTICUS Scudd.

- A. dorsalis** Burm. Greenwood Lake, Ft. Lee (Bt); Staten Island VIII-X, Dennisville IX, Tuckerton VIII (Ds); Lahaway IX, X (Coll); Lakehurst VII-IX (div); Browns Mills Jn. X (Dke).
- A. pachymerus** Burm. Greenwood Lake, Ft. Lee (Bt); Newfoundland VII, Staten Island VI, IX, Woodbridge (Ds); Staffords Forge VIII (Holman).

CAMPTONOTUS Uhler.

- C. carolinensis** Gerst. Riverton (Jn); Point Pleasant (Brown).

CEUTHOPHILUS Scudd.

- C. gracilipes** Hald. In dark cellars and barns, under stones and in hollow trees (Bt). All the species of this genus are wingless and rare, occurring in single examples only. Boonton VII, 23 (GG); Little Falls (Dke).
- C. heros** Scudd. Chester (Coll).
- C. lapidicolus** Scudd. Caldwell (Cr); New Jersey (Ss); a specimen without definite label is in the collection.
- C. uhleri** Scudd. Ft. Lee (Bt); Staten Island IX (Ds).
- C. neglectus** Scudd. Ft. Lee (Bt).
- C. maculatus** Harr. Morris Plains (Jn); Ft. Lee (Bt); "New Jersey" (Ss). *C. grandis* Scudd., *terrestris* Scudd., *blatchleyi* Scudd. and *latens* Scudd. have not yet been taken, and are better omitted from the list, although their occurrence is highly probable.

Family GRYLLIDÆ.

The "crickets," as the members of this family are popularly termed, are distinguished by the somewhat flattened form, the fore-wings lying flat on the back but bent down so as to cover also the sides. In the males the flattened surface of the wing-covers is modified into a stridulating organ with strong veins and glassy transparent cells. In the female

the ovipositor is long, cylindrical, like a stout bristle, and this makes the family easily distinguishable from the "Locustidæ" in which the ovipositor is always blade-like. The field crickets are usually black or brown, live in damp places in fields or meadows and jump readily if somewhat erratically. They are often common on cranberry bogs and are believed to eat into berries, but I have never found them doing this until after the berries were on the ground.

The shrill music of the male cricket is well known and the "song" is characteristic for each species. The eggs are usually laid in dry, sandy soil late in fall, but some forms live as adults throughout the winter and a few come into houses. As a rule they are omnivorous and occasionally cannibalistic.

The "tree crickets" are white or greenish as a rule, tending to yellowish or light brown, and they occur on trees and shrubs as their popular name implies. They are predatory in habit, feed largely on plant-lice and are therefore beneficial. Their eggs are laid in the soft shoots of trees and shrubs and some injury is occasionally done on fruit trees and berry bushes, but this is slight as compared with the benefits derived from them.

GRYLLOTALPA Latr.

G. borealis Burm. Recorded from all sections of the State VII until frost. The "mole cricket," so odd in its appearance that it attracts frequent attention and is often sent in with requests for information. Lives in burrows underground, in dams and along ditches, and has been recorded as injuring potatoes.

Columbia Scudd. is a long-winged form of the preceding and occurs with it.

TRIDACTYLUS Oliv.

T. terminalis Scudd. Atlantic Highlands (Bt); Clementon V, 30 (Jn); Lucaston (GG); Bridgeport V, 20 (Haim); Ocean Co. (Sm); Lavallette V (Vk); Anglesea IX (Dke).

T. apicalis Say. Staten Island VI, IX, on damp ground (Ds).

ELLIPES Scudd.

E. minuta Scudd. Ocean City (Jn).

CYCLOPTILUS Scudd.

C. squamosus Scudd. Lakehurst X, 3 (Ds).

NEMOBIUS Serv.

N. fasciatus De G. Throughout the State VII to frost. More common in the pine barrens, but recorded as well from the hilly sections of the north as along the beach strip to Cape May.

N. vittatus Harr. This is a form of the preceding, in which the wings are aborted. It is as widely distributed and has more northern records; it also occurs commonly on cranberry bogs.

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- N. affinis* Beut. Occurs with "fasciatus" from late July until frost (Bt).
N. carolinus Scudd. Mahwah X, Ft. Lee VIII, Cranford VIII, Brookside VIII, Staten Island VIII-XI, Lakehurst VIII-X (Ds); Jamesburg X (Coll); Atsion X, Stafford's Forge IX (Hebard); West Creek IX (Rehn).
N. canus Scudd. Sumner X, 15, Whittings IX, 28 (Long).
N. palustris Blatchley. Lake Hopatcong VIII, Lakehurst IX (Ds); Stafford's Forge IX (Hebard).
N. janus Kirby. National Park X (Dke).
N. maculatus Blatchley. Mt. Pleasant IX, 7, in oak-pine woods (H. Fox).

GRYLLUS Linn.

- G. luctuosus* Serv. (*abbreviatus* Serv.) Occurs throughout the State in late summer and fall, and perhaps our most common field cricket. Some adults winter and are found again in May. The name "abbreviatus" refers to the short-winged form. Occurs on salt marshes and upland fields and one of the common species on cranberry bogs.
G. pennsylvanicus Burm. As widely distributed as the preceding, but much less abundant. Records come from all faunal regions in late fall and early spring.
G. neglectus Scudd. Caldwell (Cr); New Jersey (Bt); Ocean Co., on cranberry bogs (Sm). May be a variety of the preceding—a point on which the authorities are not agreed.
G. domesticus Linn. New Brunswick V (Gr); the "cricket on the hearth" or house cricket; introduced from Europe.

MIOGRYLLUS Sauss.

- M. saussurei* Scudd. Staten Island V, Lakehurst VI-VII (Ds). Matures in June.

ŒCANTHUS Serv.

- Œ. angustipennis* Fitch. Ft. Lee IX, Staten Island IX, X (Ds); New Brunswick VIII (Coll); common throughout the pine barrens and extends into the Delaware Valley region—Riverton VIII, IX (Jn).
Œ. exclamationis Davis. Cranford VIII, Staten Island VIII, IX, Morgan X, Manasquan IX, Farmingdale VIII (Ds); Riverton IX, 10 (Rehn); Clementon VIII, 13 (Vk).
Œ. niveus De G. The "snowy tree-cricket." All the species of this genus are tree crickets and lay their eggs in twigs, sometimes causing injury, but not all species lay them in close series, nor do they equally produce injury. Boonton IX (GG); Ft. Lee IX, Staten Island VIII, IX, Lakehurst, in village gardens only (Ds); Jamesburg, Anglesea (Coll); Riverton VIII, Glassboro (Jn).
Œ. latipennis Riley. Staten Island VIII-X; Jamesburg IX, Farmingdale VIII, Lakehurst VIII, IX, common (Ds); Riverton VIII (Jn); Delair VIII, Lucaston IX (Dke); Medford VIII, Stafford's Forge IX (Rehn).

- CE. fasciatus** Fitch. (*nigricornis* Wlk.) Throughout the State VII-X, and locally the most common species; perhaps more abundant northwardly in the State.
- CE. 4-punctatus** Beut. Also occurs throughout the State, records extending from Greenwood Lake to Cape May and to the Delaware.
- CE. pini** Beut. Riverton (Jn); Lakehurst VII-IX (Ds); Anglesea IX (Dke).

XABEA Walker.

- X. bipunctatus** De G. Chester IX, Monmouth Co. X (Coll); Ft. Lee IX, Staten Island VIII, Atlantic Highland VIII, Farmingdale VIII, Manasquan, Tuckerton IX (Ds); Riverton VIII (Jn).

ANAXIPHA Sauss.

- A. exigua** Say. Palisades IX, Cranford VIII, Staten Island VIII-X, Jamesburg VIII, Helmetta IX, Dennisville IX, Lakehurst IX (Ds); Riverton (Jn); Medford VIII (div); Stafford's Forge VIII, IX (Rehn). Beaten from shrubbery, low trees, etc. The "*pulicarius*" Sauss. is not likely to occur in New Jersey, the "Del." and "Pa." records really referring to "*exigua*" (Rehn).

PHYLLOSCIRTUS Guer.

- P. pulchellus** Uhl. Ft. Lee VIII, IX (Bt); Elizabeth, Ocean Co. IX (Coll); Staten Island VIII-X, Jamesburg VIII, Farmingdale VIII, Dennisville IX (Ds); Clementon VIII (GG); Stafford's Forge VIII (Rehn). Found on bushes and trees.

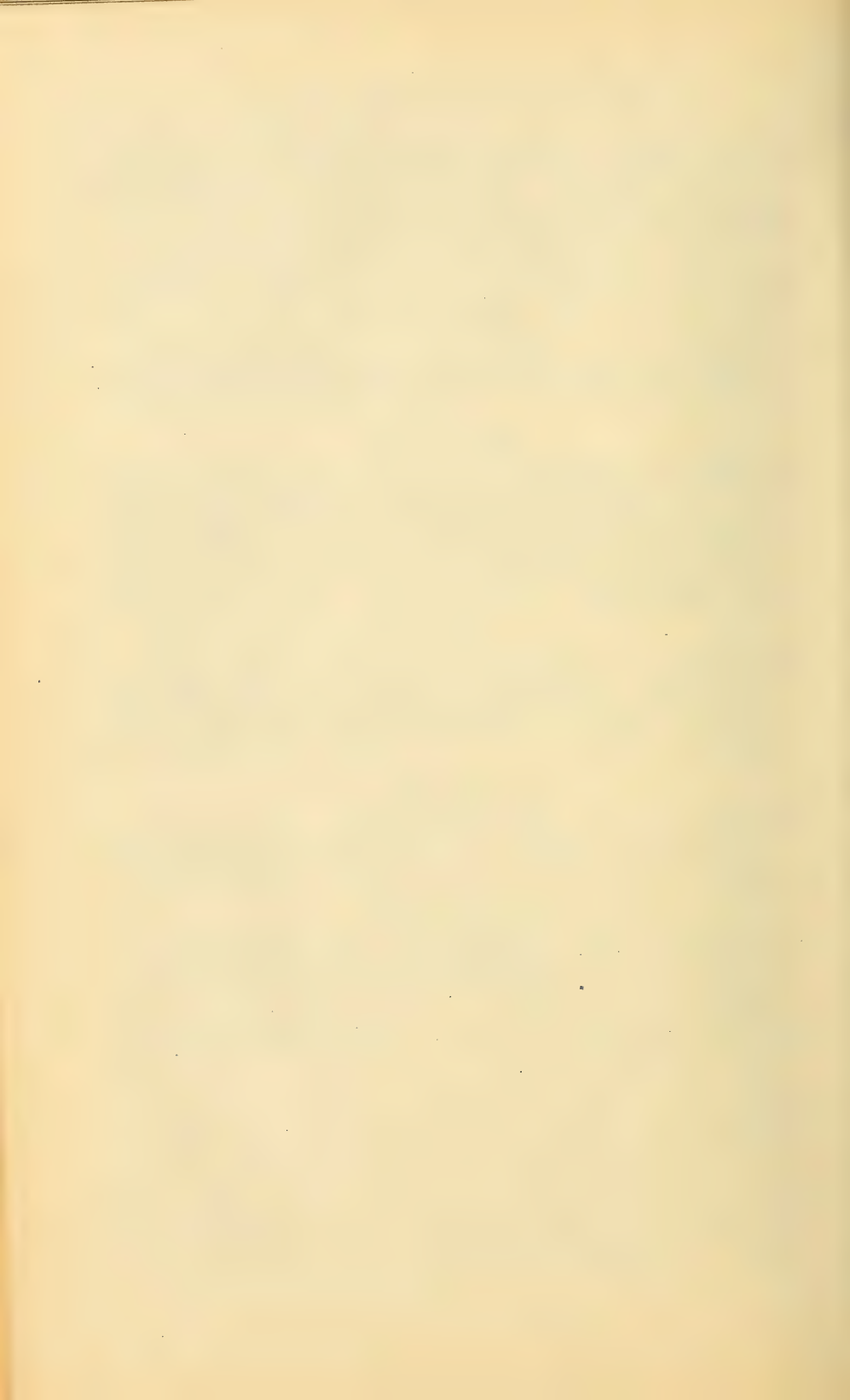
HAPITHUS Uhl.

- H. agitator** Uhl. Staten Island IX, 21, one ♀ only; Dennisville IX, Tuckerton IX (Ds); Riverton IX (div); Ocean View IX, Sea Isle City IX (Fox); Anglesea IX (div); Bayside IX (Sm); on low bushes and weeds.

OROCHARIS Uhl.

- O. saltator** Uhl. Matawan IX, Dennisville IX (Ds); Riverton VIII, Cumberland Co. IX (Jn); Bridgeton X, 15; Lahaway X, Bayside IX (Sm); on bushes and low trees.

"*Myrmecophilus pergandei*" Bruner has not yet been taken by collectors, and is therefore omitted.



Order COLEOPTERA.

The Coleoptera or beetles are recognizable by their hard or leathery wing covers, which are laid over the abdomen so that they meet in a straight line down the back, the hind wings being transversely folded beneath them. They have mandibulate or chewing mouth parts and feed on a great range of substances, animal and vegetable, as well in the larval as in the adult stages. There is no part of plants that is not attacked by some species, hence many are seriously injurious; but, on the other hand, predatory forms occur also in great abundance, and some of these are markedly beneficial. The larvæ vary much in shape, but never have more than six functional legs, and their habits are as diverse as those of the adults. The pupal stage is inactive, and the metamorphosis is therefore complete.

The characters upon which classification is based are found in the number of joints on the feet and in shape of the antennæ or feelers, the snout beetles being first separated off by the mouth parts, which are set at the end of a longer or shorter beak.

It is not usually difficult to determine whether a beetle is probably injurious, harmful or beneficial, if a few points of structure are carefully observed.

First.—Practically all weevils or snout beetles are plant feeders and may be or become injurious; none are beneficial.

Second.—All beetles that have only four apparent joints to the feet or tarsi, the third joint lobed or split, are to be looked upon with suspicion, for they are likely to be either leaf beetles, like the potato or asparagus beetle, or wood-borers of the family "Cerambycidæ," like the round-headed apple borer.

Third.—Beetles with five-jointed tarsi or feet, and feelers that have a large leaf-like club at tip are likely to be leaf chafers, like the "May-beetle" or "rose-bug," and their larvæ are "white grubs," many of which are injurious. A few of these beetles are scavengers and at least harmless, but none are to be accounted really beneficial.

Fourth.—Beetles with five-jointed tarsi and antennæ that are somewhat flattened and have the joints marked like the teeth of a saw are likely to be injurious. If the prothorax is loosely jointed to the rest of the body, they are snapping or click beetles, whose larvæ are wire-worms, and this series contains also the Buprestidæ or flat-headed borers.

Fifth.—If the antennæ are gradually enlarged toward the tip, forming a club, the insects are likely to be scavengers or feeders upon dead or dry animal or vegetable matter; but this is subject to many exceptions, and it is only safe to say that such species are not likely to be feeders upon growing vegetation.

Sixth.—Beetles in which the hind tarsi or feet are 4-jointed, while the others have five joints, are likely to prove feeders in dead or dying wood

or other vegetable tissue; but this is by no means uniform, a few species being distinctly beneficial, while others are as decidedly harmful.

Seventh.—Beetles with 5-jointed feet and slender, filiform or thread-like antennæ are probably predatory and beneficial. There are only a few exceptions to this.

The list in this order has been very materially added to in many families, and may be considered fairly accurate and complete. It has been critically looked over by a number of our best Coleopterists, and every questionable record has been verified, so far as it was possible to do so. Credit is given in all cases for work done in the various families, and in most instances the most recent American work has been followed.

There has been no recent comprehensive work on this order in the United States, and the studies in other countries, which indicate a very radical change in the arrangement of the series, have not been generally understood and accepted here. Under the circumstances, I have deemed it best to attempt no change in the arrangement, a faunal list being no proper place to introduce a mooted or new classification.

Family CICINDELIDÆ.

Commonly known as "tiger-beetles." They are long-legged, rather slender, active beetles, predatory in habit, living usually in open, sandy places, and flying readily when disturbed. The larvæ are uncouth creatures, with large head and prominent jaws, that live in vertical burrows in sandy soil, watching at the mouth for such unwary creatures as may come in their way. They are of no economic importance.

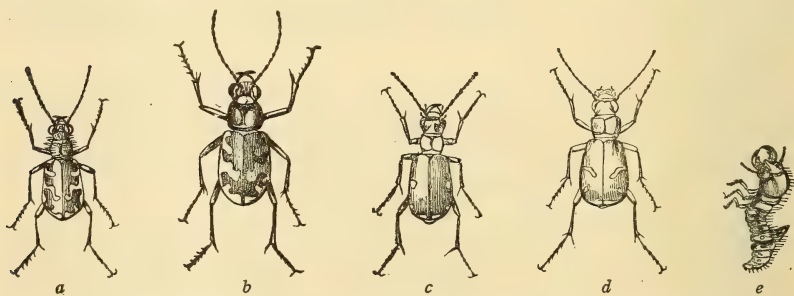


Fig. 85.—Tiger beetles: a, *Cicindela repanda*; b, *C. generosa*; c, *C. sexguttata*; d, *C. purpurea*; e, a larva.

CICINDELA Linn.

C. unipunctata Fabr. Plainfield, on the mountain road VII, 4 (div); Lakehurst VI (div); Malaga IX, 15 (GG); Atco, Woodstown (Li); DaCosta VII. (W). Usually rare and always local; partly nocturnal in habit; "found running in pine woods along roads before dark" (W).

- C. scutellaris** Say. var. **modesta** Dej. Local throughout the State south of the red shale, August to October and again in spring; the adult hibernates.
- var. **rugifrons** Dej. Lakehurst IV, V, IX, X (div); Bamber IX, 9 (Dke). The immaculate forms "nigrior" Schaupp (all black), and "unicolor" Dej. (all green or blue), are liable at any time to occur with the more normal types.
- C. sexguttata** Fab. Throughout the State, April to July, in open woods or along shaded roads; not rare anywhere and locally common.
- C. patruela** Dej. Lakehurst V, 18 (Gr); Lakewood (Coll); rare.
- var. **consantanea** Dej. Local and sometimes not rare in the pine barrens on old roads. Lakehurst IV-VII, IX, X (div); Brookville (Lg); Atco VIII, IX (div); DaCosta VI, 18 (Brn); Brown's Mills (Dke); Brigantine, Mainland IX (Hn).
- C. purpurea** Oliv. Throughout the State IV-VII and again IX, locally not rare. Of the named varieties "transversa" Leng. and "limbalis" Klug. have been found in New Jersey, the latter near Boonton IV, 28 (GG), and in Great Bear Swamp IX, 6 (Sleight).
- C. generosa** Dej. Throughout the State, but somewhat local and rarely in numbers; April to October.
- C. tranquebarica** Hbst. (**vulgaris** Say). Generally distributed and locally common throughout the southern counties during the entire season, hibernating as an adult. It is much less frequent and more local north of the red shale line.
- C. 12-guttata** Dej. Caldwell (Cr); Hackensack Meadows (Bf); Newark (Soc); Staten Island V, VI, IX, X Lakehurst IV, VII (Ds); Gloucester (Li); Atco IX, 8 (Brn); on mud banks, near water (W).
- C. repanda** Dej. Common from April to October throughout the State, hibernating as an adult. It is the most abundant and generally distributed of all our species.
- C. hirticollis** Say. Common along the coast from Staten Island to Cape May, April to September. Extends also along the shores of the Delaware and is local in the sandy districts of South Jersey, especially near swamps.
- C. punctulata** Oliv. Common throughout the State, July to September; found even in cities along side streets or in sandy lots, and is attracted to electric light.
- C. trifasciata** Fab. (**tortuosa** Dej.) Atlantic City VI, three specimens in the wash-up (Li).
- C. dorsalis** Say. Common along the seashore from Staten Island to Cape May, July and August. It is also taken inland, very locally, on white sand flats, specimens having been taken at Lahaway in August. The insect varies locally, and at some places the majority of specimens are almost immaculate.

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- C. marginata** Fab. Common along the coast on salt meadows, July and August. Reported all the way from South Amboy to Anglesea.
- C. lepida** Dej. Seashore, from Sandy Hook to Cape May, locally, VII-IX, sometimes in numbers. Also occurs in limited areas inland; one is at and another near Jamesburg, one at Lahaway, another at Clementon, and no doubt there are yet others to be discovered. Lives in holes made beneath little tufts of grass (W).
- C. marginipennis** Dej. Essex Co. and along the Delaware in North Jersey (W).
- C. abdominalis** Fab. East Plains VII, 27 (Lg); Lakehurst VII-IX (div); DaCosta in late June (Li) and early July (W).
- C. rufiventris** Fab. Upper pine barrens (Lg); East Plains, near Barnegat, in considerable numbers VII, 27 (Ds).

Family CARABIDÆ.

The "ground beetles," as the members of this family are popularly known, are usually black or dull brown in color, sometimes bronzed or metallic, and, exceptionally, usually on flower-loving forms bright blue, green and yellow. Many of the species hide during the day under stones or bark, among roots of plants, in grass at the base of trees, in burrows under ground or in other places of concealment. They fly at night, are often attracted to electric light, and in general are predatory in habit.

The larvæ are more or less fusiform, somewhat flattened above, gray or dusky in color, and they live in similar localities though even more concealed. They also are predatory and of decided economic importance, feeding upon many of the leaf-feeders that go underground to hibernate or to pupate. Those that in the adult stage live on plants,

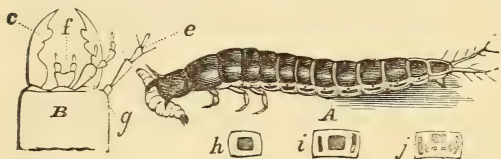


Fig. 86.—Larva of a ground beetle, feeding on a *Curculio* larva.

feed on eggs, caterpillars and slugs of herbivorous forms.

All the species have slender, filiform antennæ, 5-jointed tarsi on all feet and are somewhat depressed or flattened; those that live under bark sometimes very much so.

OMOPHRON Latr.

- O. labiatum** Fab. Along the Delaware, Camden to Woodbury V, VI (div); Anglesea (W); Brigantine Beach IX (Hn); usually rare.
- O. americanum** Dej. Boonton VI, 11, Glassboro IX, 7 (GG); W. Bergen V, and can be washed out along most streams in my district (Bf); Caldwell (Cr); Greenville VI, IX (Sp); Gloucester (Li); Atlantic Co. (W).
- O. tessellatum** Say. Mountain View VIII, 11 (GG); Anglesea V, Atlantic Co. (W).

SPHÆRODERUS Dej. (CYCHRUS Fab.)

S. stenostomus Web. Palisades V, VI, under stones (Sp); Snake Hill, all year (Bf); Caldwell (Cr); Riverton X, 21, Merchantville III, 13 (G G); Gloucester, Clementon XII, 17, sifting (W).

var. *lecontei* Dej. With the type; also Boonton III, 9, X, 11 (GG); Chester VI, 28 (Dn); Summit II, 22 (Bf); Westville (Li).

"*S. nitidicollis*" Chev. is a boreal species and the record from Lake Hopatcong is an error.

SCAPHINOTUS Dej.

S. elevatus Fabr. Englewood VII, 1 (Bt); Orange Mts., Newark Dist. (Bf); Newtonville III, 26 (Brn); Egg Harbor, Anglesea IV (div); rare.

S. unicolor Oliv. Five-mile beach V, 30 (W). This is the "violaceous" of the previous edition.

S. viduus Dej. Hopatcong VI, 3 (W); Orange Mts. (Bf); Ft. Lee IV, VI, VIII (Bt); Mays Landing (W., Li). Always rare.

CARABUS Linn.

C. sylvosus Say. Hemlock Falls (Bf); Greenville VI (Sp); Atlantic Highlands (Bt); Gloucester, Camden (div); Manumuskin VI, 21 (Dke); Anglesea VI, 20 (Coll).

var. *finitimus* Hald. Wenonah X, 21 (Dke).

C. serratus Say. Throughout the State VI, VIII, IX, often at sugar in fall.

C. limbatus Say. Throughout the State, not rare IV, V, VIII, IX.

C. vinctus Web. With the preceding, under stones and logs; the most abundant representative of the genus in the State.

C. nemoralis Müll. Newark IV, 6, 12 (Dn). This is an introduced species, and a number of examples have been taken near New York. Mr. Dickerson took 1 ♂ 1 ♀ in a city back yard, and the species is probably g. d. in the district, though rare. A specimen was taken by Mr. Clarence Riker, at Maplewood, about 20 years ago.

CALOSMA Weber.

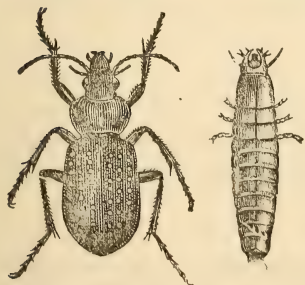


Fig. 87.—*Calosoma calidum*
and larva.

C. externum Say. Woodside (Bf); Greenville, under stones VI, IX (Sp); Newark at light (Dn); Staten Island VII, 9 (Ds); Gloucester (Li); Camden, Atlantic, Cape May Cos. (W); not common. Mr. Davis's specimen was "found under an electric light and squirted its acrid fluid into my face at a distance of about a foot."

C. scrutator Fabr. Throughout the State, locally common, often washed up along

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shore in large numbers VII-IX. Is a tree climber, a caterpillar hunter and our largest representative of this family.

- C. *willcoxi* Lec. Newark at light (div); Atlantic City (div); Ocean City (G G); Cape May Co. (div). Similar in habit to the preceding, but much smaller and less abundant.
- C. *frigidum* Kirby. Newfoundland V (Ds); Newark at light (Bf); Woodbury V, 18, Sea Isle City VI, 26 (Brn).
- C. *sayi* Dej. Staten Island (Ds); Camden, Gloucester, Atlantic, Cape May Cos. (W); Atlantic City (Li); always rare.
- C. *calidum* Fabr. Throughout the State, under stones, &c., in fields. The most abundant and generally distributed species.

ELAPHRUS Fabr.

- E. *fuliginosus* Say. Ft. Lee IV (Sf); Snake Hill IV (div). The record of "cicatricosus" in last edition was based on an example of this species.
- E. *ruscarius* Say. Throughout the State along dry ditches and on mud flats IV-VII, IX; usually not rare where it occurs.

BLETHISA Bon.

- B. *quadrifollis* Hald. Caldwell, rare (Cr).

NOTIOPHILUS Dum.

- N. *æneus* Hbst. Ft. Lee, among leaves X (Bt); Caldwell (Cr); Newark (Soc); Camden and Gloucester Co. V, IX, at various points near the Delaware (div).
- N. *semistriatus* Say. (*sibiricus* Mots.) Durham's Pond VIII, 18, Orange Mts. V, 30 (Dn); Madison (Pr); Newark, about roots of trees and under damp leaves (Bf). The true "*sibiricus*" does not occur in the U. S. at all.
- N. *novemstriatus* Say. (*semistriatus* Say.) Boonton VIII, 17, Orange Mts. (GG); Newark (Bf); Staten Island (Lg), among leaves at base of trees (Bt); New Lisbon VII, 14 Anglesea VI, 21 (Brn). This is the species listed as "*hardyi*" in the last edition, and so the species stands in most collections.

NEBRIA Latr.

- N. *pallipes* Say. Throughout the State V, VIII, IX, along rocky streams, under stones just at edge of water. More common north of Piedmont Plain.

PASIMACHUS Bon.

- P. *sublævis* Beauv. Staten Island (Ds); Monmouth Co. VIII, 10 (Coll); Sandy Hook VIII (Bt); Brigantine Beach IX (Hn); Avalon VII, 4 (Brn); Anglesea VII-X (div); always along shore.

- P. punctulatus** Hald. DaCosta VII (div); Clementon, Egg Harbor (Li); Brown's Mills VII, 4 (Dke).
P. depressus Fab. Lakehurst (Lg); Staten Island (div). Mr. Leng believes that the references to the previous species also belong here, and that "punctulatus" does not occur in New Jersey.

SCARITES Fabr.

- S. subterraneus** Fab. Throughout the State, under stones, at all seasons.
var. **substriatus** Hald. Anglesea, very rare VI (W, Brn).

DYSCHIRIUS Bon.

- D. nigripes** Lec. Newark (Bf). All the species are found near water or under leaves or burrowing in sandy banks.
D. globulosus Say. Throughout the State VI, VII.
D. terminatus Lec. Atlantic City (div); Brigantine VII, Sea Isle City VI, VII (Brn); Anglesea V, 31-VII, 11 (Brn).
D. sphæricollis Say. Boonton to Anglesea VI-IX, sometimes abundant at light; taken largely on or near the shore.
D. erythrocerus Lec. Newark (Bf); Anglesea VII, 23 (Sm).
D. sellatus Lec. Atlantic City (W, Li); Sea Isle City VI, 10 (Brn); Anglesea VII (div); strictly a maritime species (Sz).
D. pallipennis Say. With the preceding, and also a maritime form. Brigantine IX, Avalon V, 23 (Brn).
D. filiformis Lec. Orange VI, common at light (Ch); Brigantine Beach IX on salt marshes (Hn).
D. pumilus Dej. Orange VI, at light (Ch); Newark Dist (Bf); Brigantine marshes IX (Hn). The "hispidus" of last edition belongs here.

CLIVINA Latr.

- C. dentipes** Dej. Collingswood VII, 22 (GG); Woodbury VII, 7 (Brn).
C. impressifrons Lec. Orange VI (Ch); Newark (Bf), at light; Woodbury VII (GG); g. d. (Li); Anglesea (W); Cape May VI, 3 (Brn).
C. rubicunda Lec. Atlantic City, rare (Li).
C. rufa Lec. Irvington VIII, 4, one specimen (Bf).
C. americana Dej. Throughout the State IV-VII, IX, on bogs, marshes, etc.
C. striatopunctata Dej. Arlington VI (Sf); Newark district, rare, along streams (Bf); Brigantine salt marsh IX (Hn).
C. ferrea Lec. Gloucester, not common (W).
C. convexa Lec. Atlantic City, 1 specimen; Rockaway (Sf).
C. bipustulata Fabr. Throughout the State, at light V, VI, and under stones, throughout the season.

SCHIZOGENIUS Putz.

- S. lineolatus** Say. Throughout the State, at light and under stones, all season.
- S. ferrugineus** Putz. Staten Island, under logs at South Beach (Bf); Cramer Hill V (GG); Westville VI (div); Brigantine salt marshes IX, Anglesea V, 30 (W).
- S. amphibius** Hald. Irvington, rare, washing stream banks (Bf); Westville (Li); along the Delaware, near Camden, Anglesea V, 30 (W).

ARDISTOMIS Putz.

- A. obliquata** Putz. Atlantic City, two or three by Dr. Castle (Li).
- A. viridis** Say. Clifton VI (Sp); So. Orange V, 30 (Dn); Newark (Soc); Cranford, Irvington, common (Bf); Camden and Gloucester Counties, along muddy streams (W); g. d. (Li).

PANAGÆUS Latr.

- P. crucigerus** Say. Snake Hill, under stones V, VI (Sp); Brigantine Beach IX (Hn); Anglesea V, 28 (W); always in single specimens.
- P. fasciatus** Say. Madison (Pr); Caldwell (Cr); Newark, at light (Bf); Springfield III, 3 (Stortz); Ft. Lee, in ant nests IV (Bt); Snake Hill, under stones V, VI (Sp); Atlantic City, wash-up (W); Sea Isle V, VI (Brn); also rare.

NOMIUS Lap.

- N. pygmæus** Dej. Newark, one specimen (Bf); Atlantic City VI, 24 (Brn); Avalon, Anglesea (W); extremely rare in this State.

BEMBIDIUM Latr.

- B. inæquale** Say. Banks of Passaic V, IX (Sp); Elizabeth IV, 8 (GG); Westville (Li); Camden, Gloucester Co. (W); Union Co., not rare (Sm).
- B. punctatostriatum** Say. Banks of Passaic, spring and fall (Sp).
- B. confusum** Hayw. Banks of Passaic V, IX (Sp); New Jersey (Hayw).
- B. americanum** Dej. Throughout the State, along river banks, spring and fall.
- B. honestum** Say. Along the Passaic V, IX (Sp), Irvington (Bf); Camden and Gloucester Co. (W); Cramer Hill V, VI (GG).
- B. chalceum** Dej. Boonton VIII, Mt. View IX (GG); banks of Passaic V, IX (Sp); Irvington, washing stream banks (Bf).
- B. nigrum** Say. Boonton VIII (GG); along the banks of Passaic, spring and fall (Sp); So. Orange V, 30 (Dn); Irvington, Rahway (Bf); Camden and Gloucester Cos. (W).
- B. grandiceps** Hayw. "New Jersey" (Hayw). This and the next two following species occur along larger streams that have gravelly banks.

- B. guexi** Chd. Hemlock Falls, rare (Bf); "New Jersey" (Hayw).
B. fugax Lec. Boonton VI, 11, VIII 15 (GG); "New Jersey" (Hayw).
B. ustulatum Linn. Boonton IV, Glassboro VII, IX (GG); Ft. Lee (Bt); Snake Hill IV (Lv); Newark Dist. (Bf); Camden Co. (W); Gloucester Co. (div).
B. viridicollis Laf. Newark, salt meadows V, 8 (Bf).
B. variegatum Say. Throughout the State, spring and fall, along river banks, on salt marshes, cranberry bogs and similar situations.
B. versicolor Lec. Banks of Passaic V, IX (Sp); Orange Mts. VII, Newark salt meadows (Bf); Camden and Gloucester Cos. (W).
B. contractum Say. Along the seashore and on salt meadows; strictly maritime, practically all season.
B. constrictum Lec. With the preceding, but a distinct species.
B. pedicellatum Lec. Generally distributed, rare (W).
B. 4-maculatum Linn. Common throughout the State all season.
B. affine Say. Newark salt meadows (Bf); New Brunswick VI (Coll); Camden (Li); Westville I, 28 (GG); g. d. (W); Lahaway V, on cranberry bogs.
B. anguliferum Lec. "New Jersey" (Hayw).
B. assimile Gyll. Newark, salt meadows, rare (Bf).
B. semistriatum Hald. Banks of the Passaic, spring and fall (Sp).

TACHYS Schaum.

- T. nanus** Gyll. Throughout the State under bark of trees.
T. flavicauda Say. As common and distributed as the preceding.
T. granarius Dej. Staten Island (Lg), and sure to be found elsewhere.
T. fuscicornis Chd. Brigantine Beach IX (Hn).
T. incurvus Say. Along Passaic V, IX (Sp); Orange Mts. (Bf) and Ft. Lee (Bt) in ant hills; g. d. (W); Brigantine Beach IX (Hn).
T. xanthopus Dej. Newark, Woodside (Bf); Orange VI (Ch); Westville I, IV (GG); Ocean Co., on cranberry bogs V (Sm); Anglesea (W).
T. capax Lec. Chester VII, 4, Arlington III, 1 (Dn); Newark, Ocean Co., cranberry bogs V, Anglesea VII, X (Coll); Anglesea I and II, sifting (W).
T. vivax Lec. Along the Delaware River, So. Camden V, 17 (W).
T. tripunctatus Say. Summit, along river (Bf); banks of Passaic V. IX (Sp); Highlands V (Bt); Westville V, 31 (GG).
T. frontalis Hayw. Chester (Dn).
T. lævus Say. Throughout the State IX, V, VI, and in winter siftings.
T. pallidus Chd. Sea Isle City VIII (W); Avalon VI, Anglesea VI (Bru); a salt meadow species.
T. occultator Casey. Brigantine Beach IX (Hn); Avalon VI, 23 (Bru); Sea Isle City, Anglesea VIII, also on the salt meadows (W).

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- T. proximus** Say. Passaic banks V, IX (Sp); Orange VI, light (Ch); Camden, Gloucester Co. (W); g. d. (Li); Lahaway V, on cranberry bogs (Coll).
- T. scitulus** Lec. Banks of Passaic V, IX (Sp); Newark, Snake Hill, salt meadows V (Bf); Orange, Long Branch V, VI (C); Woodbury VII, 30 (GG).
- T. corruscus** Lec. Westville, throughout the winter, sifting (W).

It is reasonably certain that, in addition to the above, "dolosus" Lec. and "ferrugineus" Dej. also occur in New Jersey.

PERICOMPSUS Lec.

- P. ephippiatus** Say. Orange VI, at light (Ch); salt meadows, 1 spec. (Bf).

PATROBUS Dej.

- P. longicornis** Say. Locally not rare throughout the State V-VIII.

POGONUS Dej.

- P. lecontei** Horn. Atlantic City (Castle); Corsons Inlet VII, 20 (Li); Sea Isle City, Anglesea, common on mud flats under the dry and thickened upper crust on salt marshes (W).

MYAS Dej.

- M. coracinus** Say. Orange Mts. (Bf); South Jersey (W), very rare.
- M. cyanescens** Dej. Hopatcong (Pm); Ft. Lee, Clifton VI, VII (Sp); Staten Island (Sf).

TRECHUS Clairv.

- T. chalybeus** Mann. Milltown VII, VIII; common under dead leaves along a stony brook in accidental association with the ant, "Lasius mixtus" Nyl. (div); Westville (Brn).

PTEROSTICHUS Bon.

- P. adoxus** Say. Throughout the State spring and fall; under bark or in rotten wood (Bf); locally common.
- P. rostratus** Newn. Palisades (Sp); New Jersey (W); single specimens only.
- P. diligendus** Chd. Palisades V (Sp); Newark, on salt meadows (Bf).
- P. honestus** Say. Palisades above Hoboken in early spring (Sp, Sm).
- P. lacrymosus** Newn. Hopatcong (Pm); Chester VII, 4 (Dn); Orange Mts. VII (Bt); Newark (Soc), along Palisades in spring (div).
- P. coracinus** Newn. Hopatcong (Pm); Chester VII, 4 (Dn); Ft. Lee (Bt); Orange Mts. (Bf).

- P. stygicus** Say. Throughout the State, locally common, spring and fall.
- P. moestus** Say. Throughout the Appalachian and Highland regions, spring and fall; always in rotten logs (Bf); Staten Island (Lg); New Brunswick (Coll). The "superciliosus" of previous list is really this species.
- P. sayi** Brulle. Throughout the State, fall and spring; not rare.
- P. lucublandus** Say. Throughout the State, under stones and shelter of all kinds; one of the few species that has adapted itself to live in tilled fields.
- P. ebeninus** Dej. Ft. Lee (Sf); Atlantic City (Li); Westville (W); Sea Isle City V (Brn); Anglesea IV, V (div); single specimens only.
- P. caudicalis** Say. Snake Hill (Bt); g. d. (Li); Camden IV, 18, Westville V, 29; Avalon VII, 18 (Brn); Anglesea (W).
- P. luctuosus** Dej. Snake Hill (Bt); Newark, salt meadows (Bf); Arlington (Dn); Westville II (W); Lahaway V, on cranberry bogs (Sm); Avalon VIII, 18 (Brn).
- P. corvinus** Dej. Hopatcong (Pm); Ft. Lee (Bt); Snake Hill V, 26 (Lv); Palisades in spring (Sp); Newark (Bf); Arlington (Dn); g. d. (Li).
- P. gravis** Lec. Highlands V (Sf); Westville V, 23, 1 specimen (Brn).
- P. purpuratus** Lec. Staten Island, 1 specimen (Lg).
- P. tartaricus** Say. Hopatcong (Pm); Hoboken (Li); Cranford V, 17, Sea Girt (Bf); Sea Isle VI, 15 (Brn); single specimens only.
- P. mutus** Say. Throughout the State and everywhere abundant.
- P. erythropus** Dej. Also occurs everywhere and is locally common.
- P. patruelis** Dej. With the preceding, though less abundant.
- P. femoralis** Kirby. Orange Mts., Westville IV, 23 (GG); Staten Island (Lg).

The records for "*P. haldemanni* Lec." were based on errors.

EVARTHUS Lec.

- E. sigillatus** Say. Greenwood Lake VI (Sf); Hopatcong (Pm); Chester VII, 30, VIII, 24 (Dn); Madison (Pr); Caldwell (Cr); Irvington, Newark, Sea Girt (Bf); Atlantic City (Li); always rare.

The "sodalis" of the last edition belongs here.

AMARA Bon.

- A. avida** Say. Palisades V (Sp), VII (Bt); Snake Hill (Sf); salt meadows (Bf); Camden V, IX (div); Westville, Gloucester (Li); Mauricetown VI, 20, injuring strawberries (Sm); Cape May VI, 3 (Brn).
- A. fulvipes** Putz. Chester IX, 16 (Dn); Newark (Bf); Camden IX, 1 (GG); Atlantic City, Anglesea (Li); Brigantine VII, Avalon VII, Sea Isle VI (Brn); common in wash-up in spring (W).

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- A. exarata* Dej. Hopatcong (Pm); Caldwell (Cr); salt meadows (Bf); Camden II, IX, Woodbury VI (GG); Atlantic City VI (Brn); Anglesea in wash-up (W).
- A. latior* Kirby. Woodside, salt meadows, rare (Bf); New Brunswick VII (Coll).
- A. septentrionalis* Lec. Highlands, 1 specimen (Ch); Woodside (Sf).
- A. apricaria* Payk. Atlantic City, VI, 24 (Brn); New Jersey (Li); rare.
- A. angustata* Say. Ft. Lee (Bt); Palisades V (Sp); Newark district in spring (Bf); Cramer Hill V, VI (GG); g. d. (Li).
- A. pallipes* Kirby. Camden, Gloucester, Atlantic Counties (W).
- A. impuncticollis* Say. Throughout the State, fall and spring; common.
- A. basillaris* Say. Ft. Lee (Bt); Snake Hill IV (Sf); salt meadows (Bf).
- A. cupreolata* Putz. Snake Hill IV (Sf); "New Jersey" (Hw).
- A. fallax* Lec. Lake Hopatcong (Pm); upper Montclair (Bf).
- A. polita* Lec. Orange Mts., one specimen (Bf).
- A. interstitialis* Dej. Palisades V (Sp); Newark (Bf); Camden and Gloucester Counties, g. d. IV (Li).
- A. obesa* Say. Throughout the State, locally common V-VII.
- A. terrestris* Lec. Staten Island (Lg); Brigantine VI, 11 (Brn).
- A. chalcona* Dej. Ramapo, Eagle Rock I, 31, salt meadows (Bf); Palisades V (Sp); Woodbury (Li).
- A. gibba* Lec. "New Jersey" (Hw).
- A. rubrica* Hald. Ft. Lee (Sf); Palisades IX, 27 (Lv); Newark (Soc); Westville, Woodbury (Li); So. Jersey, in sandy places under boards (W); Sea Isle V, VI, Anglesea V, Cape May V (Brn).
- A. subænea* Lec. Brigantine Beach IX (Hn).
- A. musculus* Say. Throughout the State, spring and fall; often abundant on weeds and other herbage in September.

LOXANDRUS Lec.

- L. minor* Chd. Westville IV, 30, Anglesea VI, 15 (Brn).

DIPLOCHILA Brullé.

- D. laticollis* Lec. Palisades V, VI (Sp); Snake Hill IV, 26 (Lv); salt meadows (Bf); Hoboken (Bt); Orange, at light VI (Ch); Arlington III (Dn); meadows along Delaware V (W); Atlantic City (Li); Cape May VI, 23 (Brn).
- var. *major* Lec. Palisades, more rare than the type (Sm); Snake Hill V, 22 (Bf); Lahaway III, 14 (Coll).
- D. impressicollis* Dej. Snake Hill, one specimen (Sf).

DICÆLUS Bon.

- D. dilatatus** Say. Throughout the State VI, IX, locally not rare.
D. purpuratus Bon. Also generally distributed V, VI, IX; not common.
D. ovalis Lec. Snake Hill (Bt); Westville (Li); Collingswood IV, 2 (Brn); Gloucester, Camden, Atlantic Co. (W); not common.
D. elongatus Bon. Throughout the State, spring and fall; under stones and logs; the most abundant of our species.
D. ambiguus Laf. Hopatcong (Pm); V, 31 (W).
D. teter Bon. Chester VI, 19, VII, 4 (Dn); Ft. Lee; Snake Hill (Bt); Palisade woods V (Sp).
D. politus Dej. Throughout the State, spring and fall.

BADISTER Clairv.

- B. notatus** Hald. Hopatcong (Pm); Arlington, Millburn, Orange Mts. (Bf); Camden XI (Brn); Gloucester (Li); Woodbury VII, XI (div); the species occur rarely, in most places under old leaves.
B. pulchellus Lec. Suffern V (Bt); Newark (Coll); Arlington, salt meadows, spring (Bf); Staten Island V; Orange VI (Ch); Woodbury (div); Sea Isle City VI, 10 (Brn).
B. maculatus Lec. Woodbury VI (div); four recorders.
B. elegans Lec. Woodbury VII, 30, at light (Brn).
B. micans Lec. Hopatcong (Pm); Newark, salt meadows (Bf); Snake Hill (Sf); Orange (Ch); Westville (Li); Woodbury VIII, 7 (W).
B. reflexus Lec. Orange, one specimen VI (Ch).

CALATHUS Bon.

- C. gregarius** Say. Throughout the State, common nearly all season.
C. opaculus Lec. G. d. (W); Camden IV, Gloucester IV, DaCosta VI, 3 Brigantine VII, 5, Sea Isle VII, Anglesea IX, 12 (Brn); Atco (Li).
C. impunctatus Say. Ft. Lee (Sp); Sandy Hook VII (Bt); Atco (W); and along the seashore at all points from Atlantic City to Cape May V-VII (div).

PLATYNUS Bon.

- P. angustatus** Dej. Ft. Lee (div); Lahaway V, cranberry bogs (Sm); Anglesea (W).
P. decens Say. Hopatcong (Pm); Ft. Lee, Palisades (div); Caldwell (Cr); Newark (Soc); Anglesea VII (Sz).
P. sinuatus Dej. Ft. Lee, Palisades (div); Paterson III, 30, Hemlock Falls V, 30 (Dn); Newark, Woodside V, VI (Bf); Camden, Gloucester Co. (W); g. d. (Li); Newtonville III, 20 (Brn); Lahaway V, on cranberry bogs (Sm); Brown's Mills V, 19 (Dke).

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- P. opaculus* Lec. Ft. Lee, rare (Sp); may be an erroneous determination (Sf).
- P. tenuicollis* Lec. New Jersey (Bt); Atlantic City (Castle).
- P. cincticollis* Say. Throughout the State V, VI, IX; locally common.
- P. reflexus* Lec. Hopatcong (Pm); Chester VII, 4 (Dn); Ft. Lee (div); Palisades VII (Lv); Staten Island IV (Bt); Newark (Coll); g. d. (Li); Merchantville VI (Brn); Anglesea IV, VII (Coll).
- P. extensicollis* Say. Throughout the State V, VI, IX; the variety "viridis" Lec. rarely from northern localities.
- P. decorus* Say. Throughout the State, not common; taken in winter, sifting; also at all points along the seashore.
- P. obscurus* Hbst. (*pusillus* Lec.) Staten Island (Lg).
- P. moerens* Dej. New Jersey (GG).
- P. tenuis* Lec. Hopatcong (Pm); Jersey City (Coll); salt meadows (Bf).
- P. atratus* Lec. Caldwell (Cr); Orange V, at light (Ch); Snake Hill IV (Bt); Westville I, 28 (W).
- P. melanarius* Dej. Throughout the State in spring; locally common.
- P. propinquus* G & H. New Jersey, one specimen (W).
- P. affinis* Kirby. Ft. Lee (Bt); Palisades V (Sp); Caldwell (Cr); Newark (Bf); Jamesburg V, 10, Camden I, 28, Lahaway V, 28 (Coll).
- P. metallescens* Lec. Palisades V (Sp); Hoboken, Snake Hill V (Bt); Orange Mts., Newark, salt meadows (Bf).
- P. cupripennis* Say. Throughout the State, under stones, etc., in fields; our most brilliant species and usually somewhat rare.
- P. excavatus* Dej. Palisades (Sp); Snake Hill (Sf); Orange Mts., Newark (Bf); g. d. (Li); Westville I, 28, common everywhere (W).
- P. ferreus* Hald. Occurs with the preceding at the same dates.
- P. basalis* Lec. Hoboken, rare (Ll).
- P. nutans* Say. Palisades (Sp); salt meadows (Bf); Sea Isle VI, VII in single specimens only (Brn).
- P. albicrus* Dej. Westville VI, 6, one specimen (Brn).
- P. octopunctatus* Fabr. Throughout the State, late fall and early spring, mostly rare; sometimes taken in winter sifting.
- P. placidus* Say. Throughout the State, locally common, fall and spring.
- P. bogemanni* Gyll. Palisades (Sp); Snake Hill (Bt); Orange VI (Ch); Newark, salt meadows (Bf); New Brunswick VI, 4 (Dn); Gloucester VI (Brn); seashore to Anglesea V, VI (div).
- P. quadripunctatus* De G. Newark, at light (Bf); Highlands VI (Ch).
- P. æruginosus* Dej. Delaware Valley formation and northward, under bark and at light III-VI; more common northwardly.
- P. crenistriatus* Lec. Throughout the State, spring and fall; rare.

- P. rubripes* Zimm. Palisades V (Sp); Ft. Lee (Bt); Plainfield IV, 20 (Bf); Brigantine Beach IX (Hn); and along the seashore to Anglesea V, VI (div).
- P. punctiformis* Say. Throughout the State, spring and fall; not usually common; cranberry bogs V, 28 (Sm).
- P. sordens* Kirby. Palisades V (Sp); Arlington I, IV (Bf); Orange VI (Ch); Woodbury VIII (W).
- P. picicornis* Lec. Orange VI, one specimen (Ch).
- P. ruficornis* Lec. Palisades V, Ft. Lee (div); Westville I, 28 (W); Red Bank, Gloucester Co. IV, 20 (Brn); g. d. (W Li).
- P. picipennis* Kirby. Hopatcong (Pm); Chester VI, 28 (Dn); Hoboken IV, V (div); Arlington III, 18 (Coll); Collingswood IV, 2 (GG).
- P. lutulentus* Lec. Throughout the State, and in every month save July on cranberry bogs, salt marshes and along shore; usually rare.
- "*P. bembidioides*" De G. of the last edition was an error of determination.

OLISTHOPUS Dej.

- O. parmatum* Say. Throughout the State, always rare IV-VI.
- O. micans* Lec. Ft. Lee IV, 17, sifting (Sf); Westville I, 28, VIII, 20, under old leaves, sifting (W); Atlantic City (Li).

PERIGONA Lap.

- P. pallipennis* Lec. Arlington meadows, rare (Bf); Highland V (Sf).

ATRANUS Lec.

- A. pubescens* Dej. Palisades VI (Sp); Ft. Lee, in brooks (Li); Orange Mts. VI, in rotten wood (Bf); Westville (Li); Camden, Gloucester (W).

LEPTOTRACHELUS Latr.

- L. dorsalis* Fab. Hopatcong (Pm); Arlington IV; Snake Hill III, IV (Sf), in crevices of sand-stone between the layers (Bf); Newark III, IV, between bottom leaves of cat-tails (Bf); Orange VI (Ch).

CASNONIA Latr.

- C. pennsylvanica* Linn. Throughout the State, practically all season.
- C. ludoviciana* Sallé. Camden, in the marsh along Delaware River, found by sifting (div).

GALERITA Fabr.

- G. janus* Fab. Throughout the State; not uncommon.
- G. bicolor* Dru. With the preceding, but more rare.

TETRAGONODERUS Dej.

- T. fasciatus** Hald. Seems to be locally common in Camden and Gloucester Counties, but not reported from any other localities by any collector.

LEBIA Latr.

- L. grandis** Hentz. Throughout the State, sometimes not uncommon; feeds among other things on the eggs and young larvæ of potato beetles, but never occurs in numbers sufficient to be of any practical benefit from the economic standpoint.



Fig. 88.—*Lebia grandis*.

- L. atriventris** Say. A similar but much smaller species; also occurring throughout the State and locally common.
- L. tricolor** Say. Salt meadows II, IV (Bf); Woodbury VI, very rare (E. A. Klages); Atlantic City, one specimen only (Li).
- L. pulchella** Dej. Throughout the State, spring and fall; often on flowers and locally not uncommon.
- L. marginicollis** Dej. DaCosta (Li).
- L. viridis** Say. Throughout the State, most of the season, sometimes abundant. The variety "moesta" Lec. is reported as rare at Atco (Li).
- L. pumila** Dej. Delaware Valley region and northward, V-VIII; locally common on flowers and in sweeping.
- L. pleuritica** Lec. Ft. Lee (Sp); Snake Hill (Sf).
- L. viridipennis** Dej. Throughout the State, not usually common; mostly in low swampy areas, on salt marshes and along shore.
- L. lobulata** Lec. Chester VII, 5 (Dn); Snake Hill (Sf); Westville VII, 2, Laurel Spring V, 10, sifting (Brn).
- L. ornata** Say. Throughout the State III-IX, locally common.
- L. analis** Dej. Ft. Lee (Sp); Snake Hill (Sf); Orange VI, at light (Ch); Newark (Coll); Westville (Li); Woodbury VIII, 7, at light (Brn); g. d. (W).
- L. fuscata** Dej. Chester VII, 19 (Dn); Passaic, Ridgewood, Greenville VI, VII (Sp); Snake Hill V (div); Irvington (Bf); Arlington VI, Sea Isle City VI (Brn); Anglesea VII, 12 (Coll).
- L. scapularis** Dej. Throughout the State VI-VIII, at light and on flowers.
- L. furcata** Lec. Hopatecong (Pm); Snake Hill IV (Bf); Woodbury VI (E. A. Klages); Sea Isle V, 24, Anglesea VI, 15 (Brn).
- L. pectita** Horn. Throughout the State V-VII, IX, generally rare. This is the species listed as "vittata" in the last edition, Mr. Schwarz proving correct in his surmise as there recorded.
- L. bivittata** Fabr. Boonton VI, 10 (GG); seashore, rare (div).

COPTODERA Dej.

- C. ærata** Dej. Newark, one specimen (Bf); Lakewood V, 18 (Coll); Anglesea VII (W); seashore (Li).

DROMIUS Bon.

- D. piceus** Dej. Hoboken (Sp); Newark Dist. (Bf); Camden, Gloucester Co. (W); g. d. (Li); Anglesea VI (Sm); under bark, sometimes (Bt) on flowers.
- D. atriceps** Lec. Anglesea V (W, Coll).

APRISTUS Chd.

- A. cordicollis** Lec. Gloucester (Li); Clementon (Lt); DaCosta VI, Newtonville VI (Brn); Anglesea (Sm); on sand banks along streams like *Bembidiids*.
- A. subsulcatus** Dej. Snake Hill (Sf); Woodside in spring (Bf); Newark salt meadows VII, 24 (Coll); Avalon VIII, 3 (Brn).

BLECHRUS Mots.

- B. glabratus** Duft. (*nigrinus* Mann.) Hoboken (Sp); Ft. Lee (Bt), under bark; also among roots of grasses in dry meadows.

METABLETUS Schm.—Goeb.

- M. americanus** Dej. Throughout the State, locally common.

AXINOPALPUS Lec.

- A. biplagiatus** Dej. Ft. Lee (Bt); Hoboken (Sp); Anglesea VII (div); usually under bark of trees.

CALLIDA Dej.

- C. punctata** Lec. Greenwood Lake VI, 21 (Lv); Caldwell (Cr); Newark VII, 7 (Bf).
- C. purpurea** Say. Throughout the State V-IX; at Lakehurst quite abundant at times on oaks (Ds); often common in wash-up along shore. The "decora" of last edition was an error of record.

PLOCHIONUS Dej.

- P. timidus** Hald. Hoboken (Sp); Westville (Li); Berlin, Clementon IV. Sea Isle V (Brn); g. d. (W); generally under bark of trees.

PINACODERA Schaum.

- P. limbata** Dej. Palisades and Ft. Lee south to Cape May along the coast; Camden and Gloucester Co., Riverton III-VII, IX.
- P. platicollis** Say. Throughout the State, usually with the preceding, but extends to the northern boundaries of the State.

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CYMINDIS Latr.

- C. *elegans* Lec. Atco, two specimens (Li).
- C. *americana* Dej. Throughout the State, under stones in dry localities, nowhere common; also along shore in the wash-up.
- C. *pilosa* Say. From the Highlands southward, inland and along shore; locally common in late fall under dry cow-dung (Bf).
- C. *neglecta* Hald. Hopatcong (Pm); Newark district (Bf); Camden, Gloucester Co. (W); Atlantic City VI, 24 (Brn).

APENES Lec.

- A. *lucidula* Dej. Throughout the State, usually rare except along the shore; where it is sometimes common in the wash-up.
- A. *sinuata* Say. With the preceding, usually more rare.

PENTAGONICA Schm.—Goeb.

- P. *flavipes* Lec. Merchantville V, Sea Isle VI, very rare (Brn).

HELLUOMORPHA Lap.

- H. *nigripennis* Dej. Atco (Li); DaCosta VII, Cape May C. H. V (W); Lakehurst (Sf); Iona VI, 8 (Brn); Bamber V, 14 (Dke); always very rare.
- H. *bicolor* Harr. Ft. Lee under stones (Bt); Orange Mts. (Bf); Camden Co. (W); Woodbury VI (E. A. Klages); Sea Isle V, 24 (Brn); single specimens only.
- H. *ferruginea* Lec. Greenville, under logs, rare (Sp). The record for "texana" in last edition is a misidentification.

BRACHINUS Web.

- B. *janthinipennis* Dej. Orange Mts., in stump (Bf); Vineland (U S Ag).
- B. *viridipennis* Dej. "New Jersey" (Sp); Newark (Bf).
- B. *minutus* Harr. Along the Palisades in spring (Sp).
- B. *perplexus* Dej. Palisades V (Sp); Orange Mts., Woodbury V, 22 (GG).
- B. *medius* Harr. Orange Mts. (GG); along the Palisades (Sp).
- B. *quadripennis* Dej. Along the Palisades in spring (Sp).
- B. *conformis* Dej. Along the Palisades in spring (Sp).
- B. *cyanipennis* Say. Palisades V (Sp); Snake Hill V, 22 (Bf).
- B. *alternans* Dej. Along the Palisades in spring (Sp).
- B. *tormentarius* Lec. Salt meadows (Bf); Snake Hill.
- B. *fumans* Fab. Throughout the State and usually common.
- B. *similis* Lec. Newark (Bf); Brigantine beach IX (Hn).
- B. *cordicollis* Dej. Split Rock Lake IV, 28 (GG); Palisades (Sp); Caldwell (Cr); Orange Mts. (Bf); g. d. (Li).

This genus stands as it did in the last edition; the species still need

revision and the list is tentative merely. It is quite certain that some of the species do not occur in New Jersey and that other names must eventually be substituted.

CHLÆNIUS Bon.

- C. erythropus* Germ. Snake Hill (Bf); Atlantic Co., Anglesea in wash-up (W).
- C. sericeus* Forst. Delaware Valley region and northward in spring, sometimes not uncommon.
- C. laticollis* Say. Throughout the State; common in spring in the Ft. Lee, Snake Hill and Newark districts; more rare southwardly.
- C. diffinis* Chd. Along the Palisades in early spring (Sp).
- C. æstivus* Say. Throughout the State, spring and fall; more common north.
- C. augustus* Newn. Anglesea VII, 20, 1 specimen in wash-up (Brn).
- C. prasinus* Dej. Trenton (Hk).
- C. leucoscelis* Say. Throughout the State, under stones, common.
- C. nemoralis* Say. Throughout the State, common.
- C. tricolor* Dej. Throughout the State, common.
- C. pennsylvanicus* Say. Throughout the State; more common in the northern districts in spring.
- C. impunctifrons* Say. Palisades in spring (Sm); Ft. Lee VI (Bt); Caldwell (Cr); Camden V, Westville IX (Brn); g. d. (W, Li).
- C. niger* Rand. Throughout the State in spring; usually rare.
- C. purpuricollis* Rand. "New Jersey" (Horn).
- C. tomentosus* Say. Throughout the State all summer, under shelter of all sorts, and usually the most common species near cities.

ANOMOGLOSSUS Chd.

- A. emarginatus* Say. Throughout the State V-VII, locally common.
- A. pusillus* Say. Also generally distributed in spring and fall; but more rare than the preceding.

BRACHYLOBUS Chd.

- B. lithophilus* Say. Hopatcong VI (Bt); Palisades III (Sp); Snake Hill (Sf); salt meadows (Bf); Westville, Anglesea in meadows and under drift (W).

LACHNOCREPIS Lec.

- L. parallelus* Say. Throughout the State in spring, locally not rare; on meadows and marshes under drift; also under stones.

OODES Bon.

- O. amaroides* Dej. Palisades V (Sp); Snake Hill (Sf); Camden IV (GG); Westville, Woodbury VI (W); Atco (Li); Lawnside VI, Petersburg VI (Brn).

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- O. americanus* Dej. Hopatcong (Pm); Palisades (Sp); Hoboken IV (Bt); Snake Hill (Sf); Westville (Li); in damp places under stones, etc.
- O. fluvialis* Lec. Newark (Coll); salt meadows (Bf); Camden, Gloucester Co. under drift in meadows in spring (div); Anglesea I, 20, Cape May VI (Brn).
- O. 12-striatus* Chevr. (lecontei Chd.) Camden, Gloucester Counties (W); Anglesea VII (div); always rare.

GEOPINUS Lec.

- G. incrassatus* Dej. Piedmont Plain and southward, in sandy districts along water-courses V-VII, usually rare.

CRATACANTHUS Dej.

- C. dubius* Beauv. Woodside, Newark IV (Bf); New Brunswick VI (Sm); Cramer Hill VI (GG); Westville V, Brigantine VII (Brn); g. d. (Li); in sandy districts (W).

AGONODERUS Dej.

- A. lineola* Fab. Throughout the State, often at light, spring and fall.
- A. infuscatus* Dej. Anglesea (Li); Brigantine IX (Hn); g. d. (W).
- A. pallipes* Fab. Throughout the State, common at light in spring and early summer, and again in fall.
- A. partarius* Say. With the preceding, but not so abundant.
- A. pauperculus* Lec. Salt meadows (Bf); Lahaway V, on cranberry bogs.
- A. indistinctus* Dej. Along the Palisades in spring, rare (Sp).
- A. testaceus* Dej. Lakewood V (Bt); Atlantic City (Castle); Sea Isle City VI, 4 (Brn); Anglesea (W).

DISCODERUS Lec.

- D. parallelus* Hald. Salt meadows (Bf); Atlantic City (Li); Anglesea and the seashore generally (W).

GYNANDROPUS Dej.

- G. hylacis* Say. Hopatcong (Pm); Clifton (Ch); Caldwell (Cr); Hoboken under bark (Sp); Trenton (Coll); Atco VI (Brn); Atlantic City (Li); Anglesea VI (Sm).

HARPALUS Latr.

- H. dichrous* Dej. Caldwell (Cr); Snake Hill (Sf); South River VII, Lahaway VII (Coll); Westville (Li); Atlantic City VI, Brigantine VII (Brn); g. d. (W), rare.
- H. vulpeculus* Say. Hopatcong (Pm); Snake Hill (Bf); Newark Dist. (Bf); Riverton V, Brigantine VII (Brn) g. d. (W Li).

- H. autumnalis* Say. G. d. under leaves (W); seashore V, VI (div).
H. erraticus Say. Throughout the State VII, VIII, locally not rare.
H. viridiæneus Beauv. Throughout the State, locally common, especially in city vacant lots, and in meadows, under stones.
H. caliginosus Fabr. Throughout the State; attracted to light in early summer, and in fall often common on seeds of rag-weed.
H. faunus Say. G. d., locally common (div).
H. convivus Lec. New Brunswick, one specimen.
H. vagans Lec. Throughout the State V-VII, locally common.
H. pennsylvanicus DeG. Common throughout the State, readily attracted to light and sometimes a nuisance. The varieties "compar" Lec., and "erythropus" Dej., occurs with the type.
H. spadiceus Dej. Madison (Pr); Palisades (Sp).
H. fallax Lec. Orange VI, Highlands (Ch); "New Jersey" (Hw).
H. pleuriticus Kirby. Along the Palisades V (Sp); Newark V (Coll); Cape May VI, 3 (Brn); not common.
H. foveicollis Lec. Anglesea V, 14 (Brn); two examples which seem to agree most nearly with this and are certainly unlike any species represented in accessible collections. Mr. Schwarz makes this doubtful reference.
H. herbivagus Say. Throughout the State, most of the season, common.
H. nitidulus Chd. Clifton, Highlands, rare (Ch); Gloucester V, 1 (Brn); seashore (Li); not common.
H. viduus Lec. Lake Hopatcong (Pm).



Fig. 89.—*Harpalus caliginosus*

SELENOPHORUS Dej.

- S. pedicularius* Dej. Along shore, Brigantine to Cape May, VI-IX (div); Westville III, 5 (W); Atco VI (Brn).
S. iripennis Say. Anglesea (W).
S. gagatinus Dej. Snake Hill (Bf); Staten Island (Lg).
S. opalinus Lec. Throughout the State, fall to spring and extending into the summer; under leaves and along shore under rubbish.
S. ovalis Dej. Brigantine Beach IX (Hn).
S. ellipticus Dej. Orange Mts. IV, and thence southward along the shore to Cape May V, VI, IX; Hainesport V (Dke).

STENOLOPHUS Dej.

- S. carbonarius* Brullé. Ocean Beach (Pr); Brigantine Beach IX (Hn); Atlantic City, Anglesea (Li); Sea Isle City VI, 15 (Brn).
S. spretus Dej. Sea Isle City V, Cape May VI (Brn); Anglesea (div).
S. fuliginosus Dej. Throughout the State V-VII, IX, X, locally common.

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- S. plebeius** Dej. Irvington, salt meadows (Bf); Collingswood IV (GG); Westville I, 28 sifting (W); Gloucester V (Brn); Lahaway V, on cranberry bogs; Brigantine beach IX (Hn); locally common.
- S. conjunctus** Say. Throughout the State, not rare, spring and fall.
- S. humidus** Hamilton. Madison (Pr).
- S. ochropezus** Say. Common throughout the State fall to spring.
- S. dissimilis** Dej. Atlantic City, Anglesea, 1 specimen in wash-up (W).
- S. alternans** Lec. So. Camden, in sandy wet places (Brn).
- "*S. anceps* Lec.," of the last list, is based on an error.

ACUPALPUS Lec.

- A. hydropicus** Lec. Hopatcong (Pm); Newark salt meadow III (Bf); Lahaway V, 28, on cranberry bogs, and probably throughout the State.
- A. carus** Lec. Hopatcong (Pm); salt meadow I, 11 (Bf); Westville I, g. d. (W).

BRADYCELLUS Er.

- B. linearis** Lec. Orange VI, one example (Ch).
- B. rupestris** Say. Throughout the State, fall to spring; not rare.
- B. tantillus** Chd. Hopatcong (Pm); Orange VI (Ch); So. Camden, Anglesea (W); rare everywhere.

TACHYCELLUS Moraw.

- T. atrimediis** Say. Staten Island (Lg).
- T. kirbyi** Horn. Fort Lee (Sf).
- T. badiipennis** Hald. Woodside (Bf); Snake Hill (Sf); Westville I, 11 (W); Camden XI, Gloucester V, Anglesea V; always rare.

ANISODACTYLUS Dej.

- A. dulcicollis** Laf. Lahaway IX, 6 (Sm); Brigantine Beach IX (Hn).
- A. rusticus** Say. Throughout the State, fall to spring; common.
- A. carbonarius** Say. G. d. (W); Atlantic City (Li); Anglesea V (Coll).
- A. interpunctatus** Kirby. Newark (Soc); New Jersey VII (Bt); g. d. (W).
- A. harrisii** Lec. Ft. Lee IV, V (Bt); Newark (Soc); seashore (Li).
- A. agricola** Say. Hopatcong (Pm); Jersey City V, New Brunswick, Lahaway V (Coll); g. d. (W); locally not rare.
- A. melanopus** Hald. Salt meadows (Bf); Westville X, 4 (GG); g. d. (Li).
- A. nigerrimus** Dej. Hopatcong (Pm); Ft. Lee IV (Bt); Brigantine IX (Hn).
- A. nigrita** Dej. Hopatcong (Pm); Ft. Lee IV (Bt); Riverton V (Dke).

- A. discoideus* Dej. Throughout the State in spring, on swampy ground; never common in my experience.
- A. baltimorensis* Say. Throughout the State; common at all seasons.
- A. verticalis* Lec. Anglesea VIII (Sm).
- A. piceus* Lec. Newark at light (Bf); Woodbury VII (GG); Brigantine Beach IX (Hn); Sea Isle City VI, 15 (Brn); Anglesea (W).
- A. terminatus* Say. Throughout the State, fall to spring.
- A. lætus* Dej. Woodbury VII (W); Brigantine IX (Hn); Anglesea VI, VII (div).
- A. cœnus* Say. Newark (Bf); Woodbury VII, 30 (W); Atlantic City (Li); Anglesea VI, 21 (Brn); rare at all points.
- A. lugubris* Dej. Woodside III, 5 (Bf); Newark (Soc); Gloucester (Li); Lahaway V, 28, on cranberry bogs (W); g. d. (W).
- A. sericeus* Harr. Throughout the State, in spring; locally not rare and sometimes common at light.
- A. interstitialis* Say. Hopatcong (Pm); Madison (Pr); Orange (Ch); Ft. Lee, Snake Hill (Bt); salt meadows (Bf); Newark, New Brunswick (Coll).

Family HALIPLIDÆ.

Small, oval water beetles, pointed at each end, the greatest breadth at or a little behind the shoulders of the wing covers. Live in stagnant ponds and ditches in all stages, and are of no economic importance.

In this and the following "Dytiscidæ" all our material has been determined by Mr. Chris. H. Roberts, of New York City, who has also added materially to our records from his own experience.

HALIPLUS Latr.

- H. fasciatus* Aubé. Throughout the State V-IX; recorded by all collectors, from Garret Mt. to Anglesea, and west to the Delaware.
- H. punctatus* Aubé. "New Jersey" (U M).
- H. triopsis* Say. Orange Mts. (Bf); Spotswood, Ocean Co. (Rob).
- H. ruficollis* DeG. Throughout the State, common, VI-IX.
- H. longulus* Lec. Paterson VIII, 3 (Coll); Monmouth Co. (Rob).

CNEMIDOTUS Er.

- C. 12-punctatus* Say. Common throughout the State in spring and fall.
- C. edentulus* Lec. Paterson VI, VII, Great Piece Meadow IX, 3 (Coll); Monmouth Co. (Rob), X, 4 (Coll).
- C. n. sp.* Camden Co., VI, 11, X, 4 (Coll).
- C. n. sp.* Paterson IV, 23 (Coll).
- C. n. sp.* New Brunswick VIII, 9 (Coll).

Family DYTISCIDÆ.

These are the "diving beetles," and their larvæ are known as "water tigers" from their predatory habits, voracity in feeding and powerful mandibles. The adults are also predatory, oval and somewhat flattened, with rather short, stout swimming legs; the posterior longest and oar-like. They live in water of all kinds and may often be seen in clear springs rising to the surface, discharging a bubble of tainted air from the anal extremity and then swimming again to the bottom. They are interesting in structure and habits, but not of economic importance.

CANTHYDRUS Sharp.

- C. puncticollis* Cr. Staten Island V, 20 (Lg); Ocean Co. (Rob); Cape May C. H. (W).
C. punctipennis Sharp. Linwood (Rob); Clementon IV, 16, Petersburg V, 19 (Brn); Anglesea IV, V (Coll). Mr. Roberts says that "*C. bicolor*" Say does not occur in New Jersey, and that the records under that name in the last edition refer to this species.

HYDROCANTHUS Say.

- H. iricolor* Say. Recorded from Newark to the Delaware, and south to Cape May V, VIII, IX; taken by all collectors.
H. oblongus Sharp. Ocean Co. 1 spec.; it is common in Florida (Rob).

LACCOPHILUS Leach.

- L. maculosus* Germ. Common throughout the State in early spring and again in fall; hibernates as an adult.
L. proximus Say. Ft. Lee (Bt); Monmouth and Ocean Co. (Rob); Delair (Coll); Anglesea V (div).
L. fasciatus Aubé. Throughout the State in spring and fall; common.
L. undatus Aubé. Summit V, 1, Paterson IV, 2, Millburn IV, 30, Westville VI, 11 (Coll); Madison (Pr); Ft. Lee district (Bt); Monmouth, Ocean Co. (Rob); Merchantville IV, 24 (Brn).

HYDROVATUS Mots.

- H. cuspidatus* Germ. Ft. Lee district, Staten Island (Bt); Camden (Li); Atco V, 29, Brigantine VII, 25, Anglesea V, 28 (Brn); in stagnant water.
H. pustulatus Mels. Staten Island (Bt); Monmouth and Ocean Cos. (Rob); New Brunswick VI, 11, Anglesea V, 28 (Coll).
H. compressus Sharp. Anglesea V, 28 (Coll).

DESMOPACHRIA Bab.

- D. convexa* Aubé. Great Piece Meadows V, 2, VIII, 22, Delair, Anglesea IV, 12 (Coll); Madison VII, 28 (Pr); Orange VI, 5, at light (Ch); Camden (Li); in stagnant water.

BIDESSUS Sharp.

- B. flavicollis** Lec. Spotswood (Rob).
- B. pulicarius** Aubé. Staten Island (Coll); Ocean Co. (Rob).
- B. affinis** Say. Throughout the State; common all the year.
- B. lacustris** Say. Staten Island (Coll); Monmouth and Ocean Co. (Rob).
- B. fuscatus** Cr. Great Piece Meadow VIII, 22, Orange Mts. III, 20, Summit V, 9, Arlington III, 11, Lakehurst IX, 2, Anglesea IV, 12 (Coll); Staten Island (Lg); Ocean and Monmouth Co. (Rob).
- B. granarius** Aubé. Great Piece Meadow V, 2, Summit V, 9, S. Orange V, 27 (Coll); Madison (Pr); Ocean and Monmouth Co. (Rob); Da-Costa VII, 30 (Brn).

CELINA Aubé.

- C. angustata** Aubé. Staten Island (Lg); Newark (Bf); Ocean Co. (Rob); Sea Isle City VI, 10, Anglesea VI, 15 (Brn).
- C. grossula** Lec. Sea Isle VI, 15, Brigantine VII, 5 (Brn); Anglesea VI, VII (div). Mr. Roberts is in doubt as to whether this is the true "grossula," and considers it probably a new species.

COELAMBUS Thom.

- C. inæqualis** Fab. Represented in our collection from all sections of the State in spring and fall.
- C. punctatus** Say. Generally distributed; not rare; spring and fall.
- C. farctus** Lec. Lakehurst V, 24 (Rob).
- C. laccophilinus** Lec. Millburn IV, 30, Paterson VII, 3 (Gr); Staten Island (Lg); Ocean Co. (Rob).
- C. turbidus** Lec. Staten Island (Lg).
- C. nubilus** Lec. Paterson V, 12 (Coll); Ft. Lee (Bt); Bloomfield (Bf); Ocean Co. (Rob); Woodbury VIII, 7, Atlantic City VI, 24 (Brn); g. d. (Li).
- C. dispar** G. & H. (*dissimilis* Harr.) Woodside (Bf); Camden VII, 20 (Brn); Monmouth Co. (Rob).
- C. impressopunctatus** Sch. Common in the salt meadows along shore from Hoboken to Cape May from early spring to late fall.

DERONECTES Sharp.

- D. catascopium** Say. Lakehurst (Rob); "New Jersey" (U M).

HYDROPORUS Clairv.

- H. concinnus** Lec. Monmouth Co. (Rob). All the species of this genus occur in brooks and springs; not in stagnant water.
- H. pulcher** Lec. Newark (Bf); New Brunswick VIII, 9, Staten Island IX (Coll); Spotswood (Rob); Westville VII, 15 (W); Merchantville VII, 15 (Brn).
- H. integer** Sharp. Ocean and Monmouth Co. (Rob).

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- H. camicoides* Sharp. Lakehurst V, 29 (Rob).
H. undulatus Say. Throughout the State; locally common.
H. spurius Lec. Ocean and Monmouth Cos. (Rob).
H. clypealis Sharp. Millburn IV, 30, Camden VI, 11, Atco IX, 3 (Coll); Ocean and Monmouth Cos. (Rob).
H. proximus Aubé. Millburn IV, 30, Newark VII, Waverly VI, 27, Amboy Meadow VI, 27 (Coll); Ft. Lee Dist., Ocean and Monmouth Cos. (Rob).
H. vitiosus Lec. Fort Lee Dist. (Rob).
H. striatopunctatus Mels. Ft. Lee Dist. (Rob); Staten Island (Lg).
H. solitarius Sharp. Madison (Pr); Ft. Lee Dist. (Rob); Newark, Woodside (Bf); Delair (Coll).
H. obscurus Sturm. Clementon III, 18, Sea Isle V, 24, Anglesea VI, 15, Cape May VI, 3 (Brn); g. d., not rare (Li).
H. tenebrosus Lec. Hemlock Falls X, 2 (Coll); Monmouth Co. (Rob).
H. signatus Mann. Millburn IV, 29 (Coll); Orange Mts. (Bf); Staten Island (Lg); Monmouth Co. (Rob); Lahaway III, 26 (Coll).
H. tristis Payk. Millburn IV, 30, Orange Mts. III, 20, Lahaway III, 26 (Coll); Staten Island (Lg); Ft. Lee Dist., Ocean and Monmouth Cos. (Rob).
H. americanus Aubé. Great Piece Meadow V, 2, VIII, 22, IX, 3 (Coll).
H. dichrous Mels. Spotswood (Rob); New Jersey (U M).
H. inornatus Sharp. Lahaway III, 26 (Coll).
H. niger Say. Newark (Bf); Lahaway V, 28 (Coll).
H. modestus Aubé. In the Collection from Chester to Anglesea, spring and fall, and recorded from all parts of the State.
H. stagnalis G. & H. Lakehurst (Rob).
H. oblitus Aubé. Fort Lee Dist. (Rob).
H. vilis Lec. Sea Isle City V, 10, 2 examples (Brn).
H. difformis Lec. Great Piece Meadow XI, 24, Millburn IX, 30 (Coll); Staten Island VI (Lg).
H. sp. indet. Summit V, 11, Atco IX, 20, Lahaway (Coll). Of the species recorded in the previous edition, "*H. alpinus*" is omitted as based on an erroneous determination; and "*H. consimilis*" because Mr. Roberts questions the occurrence of the true species in New Jersey. There is a species that can be easily mistaken for it, and the New Jersey "*consimilis*" is probably one of the species described by Sharp and not yet identified in our collections.

ILYBIUS Er.

- I. biguttulus* Germ. Throughout the State; locally not rare.
I. confusus Aubé. Newark IX, 19, Westville IX, X (Coll); Monmouth Co. (Rob).

"*I. ater*" Lec. and "*I. 4-maculatus*" Aubé., of the previous edition, are omitted. Mr. Roberts questions whether the former species is North

American at all, and says of the latter that it seems to be a strictly boreal species.

COPTOTOMUS Say.

C. interrogatus Fab. Locally common throughout the State in late fall and early spring.

ILYBIOSOMA Cr.

I. bifarium Kirby. Woodside, common (Bf).

COPELATUS Er.

C. chevrolatii Aubé. Staten Island (Lg).

C. glypticus Say. Throughout the State, taken in almost every month of the year; locally common.

MATUS Aubé.

M. bicarinatus Say. Orange Mts. IV, V, Westville X, 4 (Coll); Ft. Lee VIII (Bt); Woodbury VIII, 7 (GG); Ocean Co. (Rob).

AGABETES Cr.

A. acuductus Harr. Millburn IV, 30 (Coll); Woodside (Bf); Staten Island in Woodland pools, VI (Lg); Woodbury VII, 7 (Brn).

AGABUS Leach.

A. parallelus Lec. Staten Island (Lg).

A. seriatus Say. Great Piece Meadow V, 21 (Coll); Ocean and Monmouth Cos. (Rob); Brigantine Beach VII, 5 (Brn); all the species of this genus live in spring and creeks.

A. obtusatus Say. Woodside (Bf); Monmouth Co. (Rob).

A. punctatus Mels. Ft. Lee VI (div); DaCosta V, 30, Anglesea V (Coll).

A. semipunctatus Kirby. Paterson VII, 3 (Coll); Newark (Dn).

A. æruginosus Aubé. Ocean Co. (Rob); "New Jersey" (Coll).

A. tæniolatus Harr. Common at Lakehurst (div).

A. disintegratus Cr. Throughout the State, locally common V-VII.

A. congener Payk. Great Piece Meadow V, 2, Vailsburg VI, 2 (Coll).

A. reticulatus Kirby. Monmouth Co. (Rob); Woodbury VI, 8, Anglesea V, VI (Brn).

A. erythropterus Say. Fort Lee, New Brunswick (Rob).

A. gagates Aubé. Throughout the State VI, VII.

The "*A. discors*" Lec. of the previous edition was not well determined. It is a west coast species.

RHANTUS Esch.

R. binotatus Harr. Newark (Soc); Paterson VI, 27, Delair VII, 16 (Coll); Ocean Co. (Rob).

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R. calidus Fab. Staten Island V (Ds); Camden and Gloucester Cos. (W); Lakehurst IX, 2 (Rob).

R. sinuatus Lec. "New Jersey" (Bf); Newark (Dn).

R. tostus Lec. Fort Lee (Rob).

The "*R. flavogriseus*" Cr. of the last edition was based on a misidentification; the species does not occur east of the Mississippi.

COLYMBETES Clairv.

C. sculptilis Harr. Orange Mt. Dist. (div); Ft. Lee (Bt); Snake Hill (Sf); Monmouth Co. (Rob); Waverly VI, 27, Jamesburg V, 7 (Coll); Sea Isle V, 24 (Brn).

HYDATICUS Leach.

H. stagnalis Fab. Ft. Lee Dist. (Bt); Newark IV, 14 (Coll); Staten Island V (Lg); Monmouth Co. (Rob).

H. piceus Lec. Caldwell (Cr).

H. bimarginatus Say. Woodside (Bf); Newark, Delair, Westville* X, 4 (Coll); Ocean Co. (Rob); Anglesea (Rob).

DYTISCUS Linn.

D. fasciventris Say. Hopatcong (Pm); Madison (Pr); Caldwell (Cr); Westville VII, 3 (Coll); Camden, Gloucester, Atlantic Co. (W).

D. hybridus Aubé. Newark (Coll); Staten Island III, IV, X (Ds); Spotswood (Rob); Brigantine VII, 5 (Brn).

D. verticalis Say. Newark (Coll); Staten Island III (Ds); Monmouth Co. (Rob).

D. harrisii Kirby. Caldwell (Cr).

D. vexatus Sharp. DaCosta (GG).

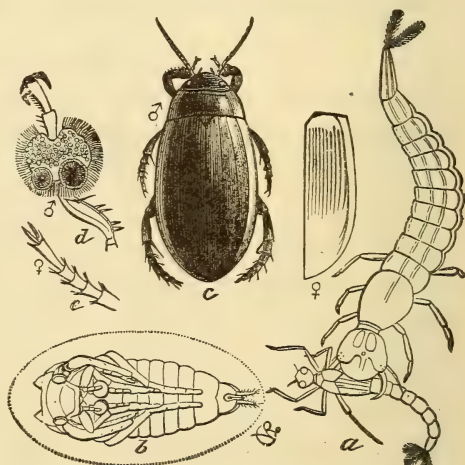


Fig. 90.—A water-tiger, *Dytiscus marginalis*: a, larva, devouring an *Agrion* larva; b, pupa; c, male beetle, elytrum of female at side; d, anterior tarsus of male; e, tarsus of female: a, b, c, about natural size.

ACILIUS Leach.

A. semisulcatus Aubé. Madison (Pr); Ft. Lee, in quarry holes (Bt); Grantwood VIII, 9 (Bno); Newark (Coll); Riverton IX, 11 (GG).

A. fraternus Harr. Paterson X, 13, Newark marsh VIII (Coll); Madison (Pr); Staten Island (Lg); Ft. Lee VII, Monmouth, Ocean Co. (Rob); DaCosta VII, 30, Brigantine VII, 5, Sea Isle V, 31 (Brn).

A. mediatum Say. Hopatcong (Pm); Ft. Lee, in quarry holes (div); Summit V, 9, Delair VIII (Coll); Camden, Gloucester, Atlantic County (W); Lucaston VIII (Dke); seashore (Li).

THERMONECTES Esch.

T. ornaticollis Aubé. Riverton V, 1, Woodbury VI, 8 (GG).

T. basillaris Harr. Ft. Lee district (Bt); Staten Island IX, X (Ds); Delair IX, 30, Westville V, 4, X, 14 (Coll); Woodbury VIII, 7; Brigantine VII, 5; Anglesea VI, 15 (Brn); g. d. (Li); the variety "intermedius" Cr. occurs at Newark (Bf).

GRAPHODERES Esch.

G. liberus Say. Recorded from all sections of the State, IV-IX.

G. fasciaticollis Harr. Ft. Lee (Bt); Staten Island IV, VIII (Ds); Newark (Coll); Monmouth, Ocean Co. (Rob).

CYBISTER Curt.

C. fimbriolatus Say. Caldwell (Cr); Newark (div); Monmouth Co. (Rob); Anglesea (Sm).

Family GYRINIDÆ.

These are the "Whirligig beetles," so named because of their habit of swimming about in groups or swarms on the surface of ponds or quiet streams and ditches, the individuals often whirling round and round without apparent aim. They are black or a little bronzed, convex above, flattened below, with short, paddle-like swimming legs, the anterior pair long and arm-like. When handled many of them emit a milky white fluid which has a fruity odor, that gives them the local name "Apple-bugs." They are predatory in the larval as well as the adult stage, and among others feed on the larvæ of "Anopheles," which are never found where these beetles occur in numbers.

Mr. Roberts has been good enough to verify the list in this family also.

GYRINUS Linn.

G. minutus Fab. Atco (Rob).

G. rockinghamensis Lec. Hopatcong (Pm); Atco (Li); Atlantic Co. (W); Lakehurst (Rob); Lakewood IX, 2; Ocean Co. VIII (Coll); everywhere common.

G. fraternus Coup. Spotswood (Rob).

G. æneolus Lec. "New Jersey," without specific locality (Rob).

G. limbatus Say. Spotswood (Rob); Atco, Egg Harbor (Li).

G. dichrous Lec. Hopatcong (Pm); Lakehurst (Rob); "New Jersey" (U M).

G. ventralis Kirby. Orange (Ch); Spotswood (Rob); g. d. (Li).

G. aquiris Lec. Spotswood (Rob).

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- G. affinis* Aubé. Anglesea (Rob); Staten Island (Coll); "New Jersey" (U M).
G. pernitidus Lec. Lakehurst (Rob).
G. analis Say. Spring Lake (Ch); Hammonton VIII (Dke); Atlantic Co. (div); Lahaway V, 28, (Coll); Clementon VII, 26, Atco IX, 2, 27 (GG).
G. marinus Gyll. Anglesea (Rob).
G. opacus Sahlb. Spotswood (Rob).
G. gibber Lec. Spotswood (Rob).
G. borealis Aubé. Madison (Pr); Hammonton VIII (Dke); Atlantic Co. (div); Lahaway V, 28, Jamesburg (Coll).
G. lugens Lec. Boonton VI, 12 (GG); Spotswood (Rob); Atco (Li).
G. picipes Aubé. Spotswood, Lakehurst (Rob); Atco IX, 27 (GG).

DINEUTES MacL.

- D. vittatus* Germ. New Brunswick and southward April to midsummer, everywhere, singly in ditches and small streams; never in ponds.
D. emarginatus Say. Westville (Rob); DaCosta, Jamesburg VIII, 24 (Coll); Merchantville VI, 5, Clementon VII, 26 (GG).
D. hornii Rob. Budd's Lake IX, 3 (Coll); Boonton V, 19 (GG); New Brunswick (Rob); Westville (Dke); Staten Island VIII, 16 (Ds).
D. nigrior Rob. Budd's Lake IX, 3, Newark, New Brunswick, Lahaway (Coll); Spotswood, Lakehurst (Rob); Boonton V, 17, Woodbury VI, 8, Clementon VII, 26 (GG).
D. assimilis Aubé. Common throughout the State nearly all summer.
D. discolor Aubé. With the preceding and equally abundant.
D. carolinus Lec. Hammonton VIII (Dke).

Family HYDROPHILIDÆ.

These are the "water scavengers," usually black in color, sometimes with yellow, orange or red markings along the margins, usually smooth, polished and very convex above, flattened below. The antennæ are short and clubbed or enlarged at tip; hence the species are easily distinguishable from the divers, which have them filiform or thread-like. A number of the smaller species are different in form and have the surface rough or pitted; these crawl rather than swim on the soil and vegetation under water. Finally there are yet other species structurally like those inhabiting the water, that live in moist earth, dung and decaying or fermenting vegetation. They are of no economic importance. As in the other water beetles, Mr. Roberts has helped out in this family.

HELOPHORUS Fab.

- H. lacustris* Lec. Locally common throughout the State all season.
H. lineatus Say. Madison (Pr); Ft. Lee V (Bt); Newark (Soc); Wood-

side, salt meadows (Bf); Westville VII, 9 (Brn); Lakehurst (Rob); g. d. (Li).

H. tuberculatus Gyll. Spotswood (Rob); Westville (Li).

HYDROCHUS Leach.

H. scabratus Muls. Ft. Lee (Bt); Newark (Soc); Long Branch (Ch); Trenton VIII, 6, Delair IX, 1 (Coll); Westville I, 28, sifting (W); Spotswood, Lakehurst (Rob); g. d. (Li).

H. inæqualis Lec. Staten Island V (Bt); Atlantic Co. (Rob).

H. subcupreus Rand. Atlantic Co. (Rob); "New Jersey" (U M).

H. variolatus Lec. Camden, not rare (Li).

H. squamifer Lec. Lake Hopatcong (Pm); Monmouth Co. (Rob); Merchantville III, 10, DaCosta, Anglesea VII, 30 (Brn).

Ochthebius benefossus Lec. was included in the previous list on a specimen labelled "New Jersey" in the Horn collection. Mr. Schwarz claimed at the time that the locality was incorrect, and as the species has not turned up since, and Mr. Roberts doubts the occurrence of any species of the genus in New Jersey, it is deemed better to omit it.

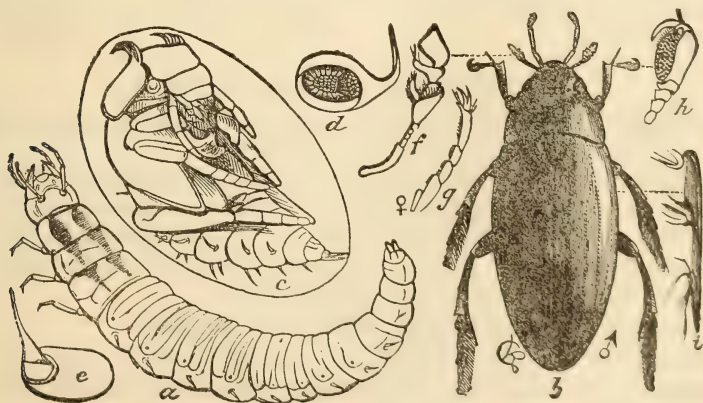
HYDRÆNA Kug.

H. pennsylvanica Kies. Ft. Lee, Snake Hill, sifting, IX (Sf); Woodside (Bf); Monmouth, Ocean Co. (Rob); Petersburg VI, 18 (Brn).

HYDROUS Leach. (HYDROPHILUS Geoff.)

H. ovatus G & H. Newark (Soc); New Brunswick VII, 24, Woodbury V, 5, Lakewood (Coll); Monmouth Co. (Rob); Riverton VII, 16, Anglesea IX, 4 (GG); Westville (Li); Mt. Holly III, 17 (Dke); always rare.

H. triangularis Say. Throughout the State, often common and sometimes attracted in great numbers to electric lights.



A water-scavenger, *Hydrophilus triangularis*.—a, the larva; b, male adult; c, pupa; d, opened, and e, closed egg case; f to i, enlarged structural details of the adult.

Fig. 91.

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- H. nimbat** Say. Throughout the State, V-IX, often abundant. "*H. limbalis*" Lec. is a western species, and the record in the last edition is based on an erroneous determination.
- H. mixtus** Lec. Great Piece Meadow V, 23, IX, 3 (Coll), Madison (Pr); Monmouth, Ocean Co. (Rob); g. d. (Li); Anglesea IX, 5 (Dke).
- H. glaber** Hbst. Great Piece Meadow IX, 3 (Coll); along the Palisades, common (div); Caldwell (Cr); Monmouth, Ocean Co. (Rob); Delair VIII (Dke); Brigantine Beach IX (Hn); Sea Isle VI, 26, Anglesea V, 9, Cape May VI, 3 (Brn).

HYDROPHILUS Leach. (HYDROCHARIS Latr.)

- H. obtusatus** Say. Throughout the State, usually common; from early spring to midsummer and again in fall.

BEROSUS Leach.

- B. pantherinus** Lec. Hopatcong (Pm); Monmouth Co. (Rob); Spring Lake, and probably along the coast (Ch).
- B. peregrinus** Hbst. Greenwood Lake VI (Bt); Newark (div); Ft. Lee (Rob); Staten Island, Anglesea VI, 20 (Coll); g. d. (Li).
- B. striatus** Say. Ft. Lee, Ocean Co. (Rob); Madison (Pr); Caldwell (Cr); Newark (Coll); Camden, Gloucester Co. (W); Woodbury V, 22 (GG); g. d. (Li).

"*B. exiguus*" Say and "*infuscatus*" Lec. are out of our faunal range, and the record in previous list is an error of identification.

LIMNEBIUS Leach.

- L. piceus** Horn. Spotswood (Rob).

LACCOBIUS Er.

- L. agilis** Rand. Snake Hill (Sf); Spotswood, Lakehurst (Rob); Westville (Li).

HELOCHARES Muls. (PHILHYDRUS Sol.)

- H. nebulosus** Say. Snake Hill, Hoboken, salt meadows (Bt); Orange VI (Ch); Newark (Bf); Atlantic Co. (Rob).
- H. ochraceus** Mels. Orange VI (Ch); Westville I, 20, Camden, Gloucester Co. (W); Lakehurst (Rob); Lahaway, on cranberry bogs V (Sm); Brigantine Beach IX, common in fresh water pools (Hn).
- H. reflexipennis** Zimm. Atlantic Co. (Rob); Brigantine IX, common in fresh water pools (Hn); Anglesea IX, 5 (Li).
- H. cinctus** Say. Throughout the State, V, VI, common.
- H. consors** Lec. Lakehurst (Rob).
- H. diffusus** Lec. Snake Hill, Hoboken IV, 24, on salt meadows (Bt).
- H. perplexus** Lec. Throughout the State IV-VI.
- H. maculicollis** Muls. Spotswood (Rob).

PHILHYDRUS Sol.

- P. hamiltoni* Horn. Newark (div); Atlantic Co. (Rob); Brigantine Beach IX (Hn); Avalon VII, 18 (Brn), Anglesea (W).

CYMBIODYTA Bedel.

- C. rotundata* Say. Caldwell (Cr); Newark (Bf); Lakehurst (Rob).
C. fimbriata Mels. Reported from all sections in early spring.
C. lacustris Lec. Hoboken (Li); Woodside, Newark (Bf); Atlantic Co. (Rob); seashore (Li).

HELOCOMBUS Horn.

- H. bifidus* Lec. (Philhydrus) Ft. Lee IV, 18, under stones (Bt); Lakehurst (Rob).

HYDROBIUS Leach.

- H. fuscipes* Linn. Orange VII (div); Camden, Gloucester Co. (W); Lakehurst (Rob); Woodbury VII, 7, Anglesea VI, 12 (Brn).
H. globosus Say. Throughout the State, in fresh water streams under stones, sometimes common, IV-VII.
H. tessellatus Ziegl. Pottersville IX, 5 (Dn); Jamesburg (Rob); Lakehurst (Lg); Westville V, 28, Clementon V, 14 (GG).
H. tumidus Lec. Camden III, 3 (Brn); normally a southern species.
H. suturalis Lec. Atlantic Co. (Rob); Brigantine Beach IX (Hn).

CRENIPHILUS Mots.

- C. despectus* Lec. Lakehurst (Rob).
C. rufiventris Horn. "New Jersey" (GG).
C. subcupreus Say. (Hydrobius) More or less common throughout the State spring and fall.
C. digestus Lec. Lakehurst (Rob).

SPHÆRIDIDIUM Fab.

- S. scarabæoides* Linn. Throughout the State, IV-IX, common on fresh cow-dung. This is a European species that was introduced into the more northern part of the State about the date of the previous edition and was therefore not included. Since that time it has spread to all sections and has become plentiful. Fortunately as a scavenger it is not a harmful species.

CERCYON Leach.

The species of this genus are not well determined in collections. It is quite probable that we have more species than are listed, and that some of those listed do not actually occur with us. Most of them live in dung or other decaying and fermenting material.

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- C. pubescens* Lec. Brigantine VII, 25 (Brn).
- C. navicularis* Zimm. Newark (Bf).
- C. melanocephalus* Linn. Newark (Bf).
- C. granarius* Er. Anglesea, in winter, sifting (W).
- C. nigriceps* Marsh. (*centromaculatus* Sturm.) Orange Mts.
- C. littoralis* Gyll. Newark (Bf); seashore (Li); a circumpolar species.
- C. prætextatus* Say. Orange VI (Ch); Hoboken IV, 24 (Bt); Brigantine Beach IX (Hn); g. d. (Li).
- C. ocellatus* Say. Fort Lee (Bt); g. d. (Li).
- C. pygmæus* Ill. Hopatcong (Pm); Madison (Pr); Ft. Lee VIII, 8 (Bt).
- C. unipunctatus* Linn. Hopatcong (Pm); Orange, in horse dung (Ch); g. d. (Li).
- C. analis* Payk. Madison, Orange Mts. (div); Merchantville III, 11 (GG); Camden (Li); Lahaway, on cranberry bogs V, 28 (Sm).
- C. depressus* Steph. Highlands (Ch).
- C. hæmorrhoidalis* Fab. G. d., common (Li).
- C. lugubris* Payk. Camden (Li).

PHÆNONOTUM Sharp.

- P. extriatum* Say. Camden (div), sifting along the river front in winter and spring (W); Westville V, 27 (Brn).

CRYPTOPLEURUM Muls.

- C. minutum* Fabr. Boonton X, 24 (GG); Arlington, Newark (Bf); Camden (Li); DaCosta V, 21 (Brn).

Family LEPTINIDÆ.

LEPTINUS Müll.

- L. testaceus* Müll. A small semi-parasitic species infesting moles, field-mice, etc., found commonly in their nests near Philadelphia and near Washington, D. C., and will undoubtedly be found in New Jersey when sought for.

Family SILPHIDÆ.

Includes the "carrion beetles" and "burying beetles," which vary much in size, form and appearance, but very little in habit. They feed not only in and on dead animal matter, but some species occur in fungi and other usually decaying vegetable matter. The antennæ are capitate, terminated by a short spherical club, which is very sensitive to odors of decay. They are of no direct benefit to the agriculturist, but some are indirectly useful by removing and changing the form of animal remains. Small animals are interred completely, the larvæ of the burying and other scavenger insects feeding upon them beneath the surface.

NECROPHORUS Fabr.

The species of this genus are the typical burying beetles.

- N. americanus* Oliv. Throughout the State, almost exclusively on reptiles, and not usually common.
- N. sayi* Lap. Ft. Lee (Bt); Hudson Co. (Ll); Staten Island VII (Ds).
- N. orbicollis* Say. Throughout the State, not common VI, VII.
- N. marginatus* Fab. Throughout the State, on carrion of all kinds, and one of the most common of our species, IV-VII.
- N. pustulatus* Hersch. Staten Island VII, 19, at electric light (Ds), Ocean Co. (Coll).
- N. tomentosus* Weber. Throughout the State, common V-IX.
- N. vespilloides* Hbst. Caldwell (Cr); Snake Hill (Sf).

"*N. guttula*" Mots. is a western species, and its record in the last edition an error.



Fig. 92.—A burying beetle, *Necrophorus americanus*; enlarged.

SILPHA Linn.

- S. surinamensis* Fab. Throughout the State under carrion; the largest of our flat forms, easily known by the greatly enlarged hind legs.
- S. lapponica* Hbst. Throughout the State; specifically on fish; but also on snakes, toads and other reptilia.
- S. inaequalis* Fab. Throughout the State; not rare; a general feeder.
- S. noveboracensis* Forst. Throughout the State; common.
- S. americana* Linn. Occurs on toadstools and in dung, as well as on carrion everywhere; not usually common.

CHOLEVA Latr.

- C. simplex* Say. Newark (Bf), Ocean Co. II, 8 (Coll); on store cheese (Sf).
- C. basillaris* Say. Hudson Co. (Ll), Anglesea VII, 23 (Coll); on store cheese (Sf).
- C. clavicornis* Lec. Hopatcong (Pm); Newark (Bf); Westville IV, 24 (Brn); baiting with store cheese (Sf).
- C. terminans* Lec. Anglesea VII (Sz); baiting with dead fish (Lv).

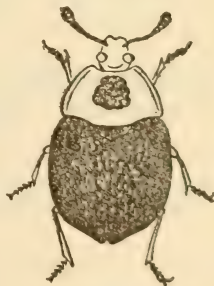


Fig. 93.—A carrion beetle, *Silpha americana*; enlarged.

PRIONOCHÆTA Horn.

- P. opaca* Say. Throughout the State, sometimes common, IV-VII; taken on old store cheese, baiting (Sf).

PTOMOPHAGUS III.

P. consobrinus Lec. Common everywhere (Sz).

P. pusio Lec. Bronx Park, N. Y. (Sf); and sure to occur in New Jersey.

CATOPOMORPHUS Aubé.

C. parasitus Lec. Ft. Lee, Arlington, sweeping at dusk (Sf); Hudson Co. (Ll); Newark (Bf); Red Bank on Delaware IV, 20 (Brn); occurs in nests of "Formica integra."

COLON Hbst.

C. bidentatum Sahlb. Eagle Rock, accidentally found on hickory (Bf).

C. dentatum Lec. Snake Hill, sweeping, at dusk (Sf).

ANISOTOMA III.

A. alternata Mels. Staten Island X (Ds).

COLENIS Er.

C. impunctata Lec. Orange Mts., VII, in mushrooms (Sf), Staten Island (Ds).

LIODES Latr.

L. polita Lec. Staten Island (Lg).

L. discolor Mels. Hudson Co. (Ll); Atlantic Highlands (Sz); Seaville VI (Brn).

L. basalis Lec. Spring Lake (Ch); Gloucester VII (W).

The species of this genus are found on a slime-mold, "Foligo septica," which grows on the surface of stumps of felled trees or under the bark of dead trees.

CYRTUSA Er.

C. picipennis Lec. Arlington IV, V, sweeping at dusk (Sf).

C. egena Lec. Arlington IV, V, sweeping at dusk (Sf).

ISOPLASTUS Horn.

I. fossor Horn. New York City, 1 spec. (Sf).

AGATHIDIUM III.

A. oniscoides Beauv. Orange Mts. (GG); Snake Hill (Ll); Highlands (Sf); Newark; Salem (Coll); occurs generally in rotten wood and under old bark.

A. exiguum Mels. Hudson Co. (Ll); Highlands V, 30, under bark (Sf); Westville V, 23, Clementon IV, 21 (Brn); g. d. (Li); Lahaway VI, 28 (Coll).

AGLYPTUS Lec.

- A. levis** Lec. Mr. Schwarz says that this is a common species in the New Jersey district, and believes that it will be found in collections mixed with undetermined Phalacrids or small Coceinellids.

CLAMBUS Fisch.

- C. gibbulus** Lec. Ft. Lee VIII, sifting, 1 specimen (Sf).

Family SCYDMÆNIDÆ.

This family and the following "Pselaphidæ" contain small or very small species often of odd or bizarre forms with usually large antennæ, often distorted and terminated by a large club, the wing-covers often short, not covering the abdomen. They are seldom seen except by the collector, and their habits are indicated in the notes to the species. Comparatively little has been added since the last edition, and Mr. H. W. Wenzel is still to be considered general authority for the notes and comments not otherwise credited.

CHEVROLATIA Duv.

- C. amœna** Lec. The type locality is Ft. Lee (Sf).

EUCONNUS Thoms.

- E. ventralis** Casey. Under old leaves I-IV, in marshes, abundant but very local; Snake Hill (Sf); along the Delaware (W).
E. clavipes Say. Snake Hill, Arlington (Sf); g. d. under layers of old leaves and in meadows under pieces of wood.
E. bicolor Lec. (*lecontei* Schauff.) Snake Hill (Sf); Camden to Anglesea, g. d. I-IV, under old leaves and moss.
E. cavipennis Casey. Anglesea IV, under very rotten leaves.
E. occultus Casey. Ft. Lee (Sf); in rotten logs with the preceding.
E. affinis Casey. Greenwood Lake (Sf); in old logs and with colonies of "*Lasius mixtus*" Nyl., near Philadelphia.
E. salinator Lec. Throughout the State; but usually under sticks and stones on or along salt marshes in early spring.
E. fatuus Lec. Ft. Lee, Snake Hill, Arlington, common V, VI, sweeping (Sf); Westville VII, Anglesea III, under old leaves and in wet moss.

PYCNOPHUS Casey.

- P. rasmus** Lec. Woodbury VII, 23, from an old pine log (W); exclusively myrmecophilus (Sz).

CONNOPHRON Casey.

- C. oreophilum** Casey. In rotten wood I-VIII, near Philadelphia.
C. fossiger Lec. Ft. Lee, Snake Hill, Arlington (Sf); Camden I. 22 (GG); g. d., I-IV, under old leaves and moss in damp places (W).

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- C. *brevicorne* Say. Arlington, Snake Hill (Sf); Lahaway V, 28 on cranberry bogs (Sm).
- C. *clavicorne* Casey. Snake Hill (Sf); Collingswood VI, 29, under leaves.
- C. *longipilosum* Casey. Gloucester III, Clementon IX, from deep moss.
- C. *frontale* Casey. Snake Hill, Arlington, So. Orange (Sf); g. d., throughout the year, under layers of dead leaves.
- C. *hirtellum* Lec. Madison (Pr).
- C. *pyramidale* Lec. Near Philadelphia VI, under bark of oak.
- C. *bifidum* Lec. Lakehurst IX (Sf).
- C. *trinifer* Casey. Snake Hill IV, Arlington VI, throughout the year, g. d., under dead leaves.
- C. *fulvum* Lec. Throughout the State VII, VIII, under rotten leaves and from rotten wood.
- C. *capillosum* Lec. Clementon IX, 14, under the roots of a sedge.

SCYDMÆNUS Latr.

- S. *perforatus* Schaum. Throughout the State g. d., under leaves and moss.
- S. *badius* Casey. Ft. Lee IV (Sf); g. d., VI-VIII, under old bark and leaves and around roots of dead trees.
- S. *corpusculum* Casey. Ramapo, N. Y., and sure to occur in New Jersey (Sf).
- S. *turbatus* Casey. Fort Lee (Sf).
- S. *subpunctatus* Lec. Westville IV, V, in moss.
- S. *pubipennis* Casey. Gloucester, Westville, Clementon VII, VIII, under deep layers of rotten leaves.

OPRESUS Casey.

- O. *othonus* Casey. Bronx Park VI, from rotten hemlock (Sf).
- O. *sp. indet.* Clementon VII, 27, from dead oak.

EUMICRUS Lap.

- E. *motschulskii* Lec. From very rotten wood near Philadelphia X.

CEPHENNIUM Mull.

- C. *corporosum* Lec. Palisades VIII (Sf); Woodbury III, under old leaves.

ASCYDMUS Casey.

- A. *tener* Casey. Clementon IX, 17, taken from rotten wood.

ACHOLEROPS Casey.

- A. *zimmermanni* Schaum. Near Philadelphia in meadow under board (W); exclusively myrmecophilus (Sz).

Family PSELAPHIDÆ.

RHEXIUS Lec.

R. insculptus Lec. Snake Hill V, 30, sweeping at dusk (Sf).

RHEXIDIUS Casey.

R. canaliculatus Lec. Ft. Lee VIII, Watchung Mts. VII, Lakehurst IX (Sf); Westville, Clementon, Atco, Anglesea I-VIII, under old leaves and in rotten wood; not rare.

EUPLECTUS Leach.

- E. confluens** Lec. Snake Hill (Sf); Clementon VI, from rotten logs.
E. pertenuis Casey. Anglesea III, 11, one example from old leaves.
E. sexualis Casey. Woodbury VII, 23, from a very rotten log.
E. tenellus Casey. Near Philadelphia VII, 16, from a very rotten log.
E. spec. indet. A number of specimens representing two species, not determinable from the material at hand.

DALMOSELLA Casey.

D. tenuis Casey. Clementon IX, 17, a single female from rotten wood.

This genus contains the most minute species of the family, and there is at least one undescribed species from New Jersey.

BIBLIOPECTUS Reitt.

B. ruficeps Lec. Snake Hill (Sf); Anglesea III, IV, under deep layers of rotten leaves; rarely.

ACTIUM Casey.

A. angustum Casey. Greenwood Lake, Montclair, Ft. Lee (Sf).

TRIMIOPECTUS Brend.

T. obsoletus Brend. Near Philadelphia VI, from rotten oak stump.

EUTYPHLUS Lec.

E. similis Lec. Westville VIII, 20, from an old pine log.

TRIMIOMELBA Casey.

- T. convexula** Lec. G. d. in damp woods, under old leaves; rare.
T. dubia Lec. With the preceding, but more common.

MELBA Casey.

- M. parvula** Lec. Anglesea III, IV, under old damp leaves and grasses.
M. fossiger Casey. Lahaway V, 28, on cranberry bog (Sm); Clementon, Anglesea VII, under old leaves.

BATRISODES Reitter.

- B. ionæ** Lec. Summit (Sf); Anglesea IV, 20, IX, 4, from dry oak bark, VII, 3, with "*Lasius*," probably "*mixtus*."
- B. monstrosus** Lec., var. **ferox** Lec. Hopatcong (Pm); Staten Island (Lg); Laurel Spring V, with "*Lasius interjectus*."
- B. schaumii** Aubé. Ft. Lee VIII, sifting (Sf); from old logs, near Philadelphia.
- B. uncicornis** Casey. (*riparius* Say.) Anglesea VII, under bark of old stumps.
- B. globosus** Lec. Ft. Lee; Alpine III, in nest of a red ant, Snake Hill (Sf); g. d., under bark of old stumps and rotten logs VI-VIII.
- B. denticollis** Casey. Ft. Lee, Snake Hill, Watchung Mts. (Sf); under old leaves in marsh along Delaware River front, near Camden.
- B. denticauda** Casey. Newfoundland (Lg); So. Orange (Dietz).
- B. striatus** Lec. Ft. Lee (Sf); Staten Island (Lg).
- B. spretus** Lec. Near Philadelphia III, 18, under bark of an old oak.
- B. triangulifer** Brend. Newark, Lakehurst (Sf); Woodbury III, 25, in dark woods under deep layers of old leaves.
- B. nigricans** Lec. Under very deep layers of old leaves in marshes along the Delaware River, near Camden IV.

The record of "*B. lineaticollis*" Aubé is an error of determination.

ARTHMIUS Lec.

- A. involutus** Casey. Clementon IX in woods among roots of "*Carex*" sp.

DECARTHRON Brend.

- D. abnormis** Lec. Throughout the State and throughout the year; more common in winter and spring; under leaves and moss.
- D. exsectum** Brend. Snake Hill (Sf); Anglesea III, under old leaves.
- D. stigmatum** Brend. South Orange (Bf); exclusively *myrmecophilus* (Sz).
- D. strenuum** Brend. Staten Island (Lg).
- D. longulum** Brend. Ft. Lee, Snake Hill (div); Orange (Ch).
- D. formiceti** Lec. Clementon VII, Westville VIII, under layers of old leaves and chips in damp woods (W); Lahaway V, on cranberry bogs (Sm).

RYBAXIS Saul.

- R. valida** Brend. Lahaway V, 28, on cranberry bogs (Sm); Anglesea III, 11, under old leaves.
- R. conjuncta** Lec. Occurs with the following, under same conditions.
- R. brendeli** Horn. Suffern VII, 27 (Sf); Lahaway V, 28, on cranberry bogs (Sm); Anglesea III, 11, under old leaves.
- R. mystica** Casey. Anglesea V, 28, under old leaves.

BRYAXIS Leach.

- B. luniger** Lec. In salt meadows with "abdominalis," but more rare (Lg); Anglesea, rare, under drift IV, 7, VI; also found under a submerged log on salt meadow, and this species can live submerged.
- B. abdominalis** Aubé. Staten Island, salt meadow under chips (Lg); Anglesea III, rare, under leaves and chips, and sifted from layers of old grass.
- B. dentata** Say. Anglesea III, 11, IX, 4, under old leaves.
- B. terebrata** Casey. Snake Hill, sweeping at dusk (Sf).
- B. perpunctata** Brend. Anglesea V, 30, a single example near the beach.

REICHENBACHIA Leach.

- R. gemmifer** Lec. Palisades VIII, IX (Sf).
- R. divergens** Lec. Palisades IV, Snake Hill (Sf).
- R. congener** Brend. Snake Hill (Sf); Staten Island (Lg); Lahaway V, on cranberry bogs (Sm); Anglesea, common in damp moss in winter.
- R. gracilis** Casey. Anglesea IV, 15, under submerged logs on salt meadows.
- R. scabra** Brend. Camden IV, Anglesea II, rare, under layers of old leaves.
- R. rubicunda** Aubé. G. d., common, under damp old leaves and moss.
- R. insolita** Casey. Anglesea V, under old leaves.
- R. puncticollis** Lec. Snake Hill, Arlington, sweeping (Sf); Lahaway V, on cranberry bogs (Sm); Anglesea, common in damp moss in winter.
- R. inepta** Casey. Anglesea III, 18, under old leaves.
- R. polita** Brend. Anglesea II, III, rare, under old leaves and moss.
- R. propinqua** Lec. Lahaway V, 28, on cranberry bogs (Sm); Anglesea, under old leaves.

NISAXIS Casey.

- N. tomentosa** Aubé. Hopatcong (Pm); Snake Hill IV (Sf); Anglesea, in colonies close together on submerged log in salt meadows.

BYTHINUS Leach.

- B. bythinoides** Brend. Westville, Anglesea I-IV, under deep layers of old leaves, very rare.

TYCHUS Leach.

- T. minor** Leach. Throughout the State all the year, under deep layers of old leaves. The "*Cylindrarctus testaceus*" of the last list refers to this species, and so does the sp. indet. referred to under this genus. "*Eupsenius glaber*" Lec. is omitted because based on a misidentification.

PSELAPHUS Hbst.

- P. erichsoni** Lec. Hopatcong (Pm); Ft. Lee (Bt); Arlington VI (Sf); Newark (Bf).
P. longiclava Lec. Irvington XII, 30, under stones (Bf).
P. fustifer Casey. Ft. Lee VIII, sifting (Sf); Staten Island (Lg); Anglesea I-IV, under old leaves, not rare.
P. bellax Casey. Just north of the State line, and sure to occur in New Jersey.

PILOPIUS Casey.

- P. piceus** Lec. Throughout the State, common, under old leaves in winter; under boards and stones in early spring.
P. consobrinus Lec. Occurs with the preceding in equal abundance.

CEOPHYLLUS Lec.

- C. monilis** Lec. Woodbury IV, 12, Clementon IX, from old rotten log, in company with the ant "*Lasius interjectus*" Mayr.

TMESIPHORUS Lec.

- T. costalis** Lec. Clementon VI, VII, from old pine logs (W); the species of this genus are exclusively "*myrmecophilus*" (Sz).
T. carinatus Say. With the preceding (W); Lakehurst IX (Lg).

CEDIUS Lec.

- C. ziegleri** Lec. Hopatcong (Pm); Ft. Lee, in ant hills (Bt); So. Orange (Bf); Woodbury X, 7, in ant hills (W).

TYRUS Aubé.

- T. humeralis** Aubé. Ft. Lee V, Lakehurst, under bark of pine log IX (Sf); Gloucester VIII, from rotten pine log.

ADRANES Lec.

- A. cæcus** Lec. Arlington V (Sf); Staten Island (Lg); Clementon, Woodbury, Laurel Springs, Anglesea I-VII, with "*Lasius mixtus*," Nyl., and under leaves.
A. lecontei Brend. Staten Island (Lg); Woodbury IV, 13, occurs rarely with colonies of ants, "*Lasius mixtus*" Nyl.

Family STAPHYLINIDÆ.

These are the "rove beetles," known by the very short wing-covers, which leave most of the slender, flexible abdomen exposed. They are usually long and slender in form, depressed or even much flattened, and have moderately clubbed, rarely very long antennæ. They live on decay-

ing animal or vegetable matter, in excrement, fungi or fermenting sap, and are among the most universally distributed of all beetles. Many of them are predatory, and some have been accused of feeding on living plants; but on the whole they are of importance to the agriculturist only as scavengers, and as they aid in reducing the dead animal and vegetable matter into shape for assimilation by plants.

The classification of the group is unsatisfactory, and the New Jersey collections are not all well determined. There has been no general revision since the last edition of the list, but there have been important papers by Dr. Fenyès, Major Casey and others. A great many new species have been described, some from neighboring States, which are certain to be found in New Jersey; but it has been deemed best not to include more than a very few of these. There is no doubt that a thorough revision of the family, including the New Jersey material, will add many species to our list.



Fig. 94.—A
Staphylinid.

GYROPHÆNA Mann.

G. vinula Er. Throughout the State in toadstools.

HOMOLOTA Mann.

H. plana Gyll. "New Jersey" (U S N M).

H. lividipennis Mann. Ft. Lee (Bt); Snake Hill, Arlington (Sf); Cramer Hill V, Westville IV, VI, Longport VI, Beesley's Point III (Rk).

THINUSA Casey.

T. maritima Casey. (*Polystoma*) Highland Beach V, 30 (Sf); Brigantine Beach IX (Hn); Longport VI (div); Cape May VII (Sz).

BOLITOCHARA Mann.

B. trimaculata Er. (*Homolota*) Ft. Lee (Bt); Collingswood III, 2 (GG).

FALAGRIA Mann.

F. dissecta Er. Ft. Lee (Bt); Snake Hill, Arlington (Sf); Woodbury V (Rk); DaCosta VII (Brn).

F. cingulata Lec. Ft. Lee, Highlands, IV, V, under bark of rotten wood (Sf).

MERONERA Casey.

M. venustula Er. (*Falagria*) Ft. Lee IV (Bt); Westville IV (Rk); Gloucester V (Brn).

CHITALIA Sharp.

C. scutellaris Lec. "Coney Island" (Casey); sure to occur on our own coast in similar situations.

C. bilobata Say. (*Falagria*) Camden III, 30 (Rk).

C. nigrescens Casey. "Iowa to New Jersey" (Casey).

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TACHYUSA Er.

T. cavicollis Lec. Ft. Lee, Snake Hill, South Orange (Sf).

GRYPETA Casey.

G. nigrella Lec. (Tachyusa) "New Jersey" (U S N M).

G. baltifera Lec. "Elizabeth, N. J." (Casey).

ATHETA Thom.

A. modesta Mels. (Homolota) Fort Lee (Bt).

A. analis Grav. (Homolota) Ft. Lee (Bt); Camden III, Westville IV (Rk).

A. pallitarsis Kirby. (Homolota) Westville VI, 16 (Rk).

A. lucida Casey. "New Jersey" (Casey).

HOPLANDRIA Kraatz.

H. lateralis Mels. Westville V, 5 (Rk).

H. pulchra Kraatz. Anglesea VII, 23 (Coll).

TRICHIUSA Casey.

T. setigera Casey. "New Jersey" (Casey).

ZYRAS Casey.

Z. rudis Lec. "New Jersey" (Rk); fide Sz.

XENODUSA Wasman.

X. cava Lec. (Lomechusa) Found in the galleries of the large black carpenter ants, "*Camponotus pennsylvanicus*" and "*vicinus*," and may be counted upon wherever these occur; always rare.

OXYPODA Mann.

O. sagulata Er. "New Jersey" (U S N M).

ALEOCHARA Grav.

A. lata Grav. Throughout the State, common under dead animal matter; the other species usually in excrement; IV-VII. The records under "*brachypterus*" in last edition belong here.

A. bimaculata Grav. Throughout the State all season; common.

A. nitida Grav. Cramer Hill, Westville V, DaCosta, Atco VI (Rk).

A. fuscipes Grav. Newark (Rk).

MYLLÆNA Er.

M. minuta Grav. (*fuscipennis* Kraatz.) Ft. Lee VIII, Snake Hill, Arlington (Sf); Anglesea VIII (Sz). This is the species recorded as "*M. rufipennis*" in last edition.

DINOPSIS Math.

D. americanus Kraatz. Snake Hill, Arlington VI, 4 (Sf).

ACYLOPHORUS Nordm.

A. pronus Er. Throughout the State in spring; locally common under debris near water.

HETEROTHOPS Steph.

H. fumigatus Lec. "New Jersey" (U S N M).

QUEDIUS Steph.

Q. fulgidus Fabr. Ft. Lee (Bt); Caldwell (Cr); Hudson Co. (Ll); Westville II, 24, Merchantville X, 1.

Q. peregrinus Grav. Westville V (Rk); "New Jersey" (Horn, U M).

Q. capucinus Grav. Hudson Co. (Ll); Anglesea (W); "New Jersey" (div).

Q. lævigatus Gyll. Hudson Co. (Ll); Brigantine, mainland IX (Hn).

Q. molochinus Grav. Hudson Co. (Ll); "New Jersey" (U S N M).

Q. brunneipennis Mann. Brigantine Beach IX (Hn); Anglesea V, 28.

Q. ferox Lec. Hopatcong (Pm); Hudson Co., rare (Ll).

Q. vernix Lec. Hudson Co., rare (Ll); Newark (Soc); "New Jersey" (U M).

LISTOTROPHUS Perty.

L. cingulatus Grav. Throughout the State under animal and vegetable decay; one of the few species found on human excrement (Sm).

L. capitatus Bland. Greenwood Lake VII (Sf); New Jersey (U M); always rare.

CREOPHILUS Kirby.

C. villosus Grav. Throughout the State, common under or on dead animals; more rarely on excrement.

STAPHYLINUS Linn.

S. badipes Lec. Orange Mts. (Rk); Newark, Anglesea V, 28.

S. vulpinus Nordm. Throughout the State, all season, in decaying matter.

S. maculosus Grav. Throughout the State, all season, usually under excrement; our largest species, and locally not rare.

S. mysticus Er. Throughout the State, IV-VII, in decaying vegetable matter and under stones.

S. tomentosus Grav. Throughout the State, with the preceding.

S. fossator Grav. Throughout the State, V-IX, usually on gilled fungi.

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- S. cinnamopterus* Grav. Our commonest species; occurs everywhere.
S. violaceus Grav. Throughout the State, IV-VI, under bark and in fungi; not common.
S. viridanus Horn. Hopatcong (Pm).
S. praelongus Mann. Orange Mts. (Rk); Snake Hill (Bt); Hudson Co. (Ll); Brigantine Beach IX (Hn); Avalon VI, Sea Isle V (Brn); Anglesea V, VII, under drift (div).

OCYPUS Kirby.

- O. ater* Grav. Throughout the State VI-IX, under stones, common.

BELONUCHUS Nordm.

- B. formosus* Grav. Ft. Lee (Bt); Hudson Co. (Ll); Orange Mts. (Rk); Newark (Soc); g. d., on sap of wounded trees (W).

TYMPANOPHORUS Nordm.

- T. puncticollis* Er. Camden XI, 23 (W).

PHILONTHUS Curt.

- P. politus* Linn. (*æneus* Rossi.) Throughout the State, all season, not common. The species of this genus feed on fungi, sap and vegetable decay generally, and are found under bark of trees, stones and in the infested fungi often in large numbers.
P. sericinus Horn. Hudson Co., rare (Ll); Newark (Soc); New Jersey (U M).
P. umbratilis Grav. Westville VIII, 16 (Rk); New Jersey (Horn).
P. lætulus Say. Orange Mts. (Rk); Newark (W); Highlands X (Sf).
P. asper Horn. New Jersey (Sf).
P. hepaticus Er. Throughout the State V-IX; not rare.
P. umbrinus Grav. Ft. Lee (Bt); Hudson Co. (Ll); Brigantine Beach IX (Hn); Anglesea (W); always rare.
P. quisquiliarius Gyll. (*quadricollis* Horn.) Newark (Soc); Beesley's Point VIII, 23 (Rk).
P. debilis Grav. Spring Lake, in cow-dung (Ch); Camden III (Rk); Westville (W); Merchantville III (div).
P. varians Payk. "New Jersey" (U S N M).
P. longicornis Steph. Ft. Lee (Bt); Hudson Co. (Ll); g. d. (W).
P. discoideus Grav. Ft. Lee, in mushrooms (Bt); Hudson Co. (Ll).
P. alumnus Er. Common throughout the State all season.
P. fusiformis Mels. Woodbury V (Rk); Brigantine Beach IX, common (Hn).
P. thoracicus Grav. Merchantville X (W); Gloucester Co. IV, 20 (Brn).
P. schwarzii Horn. Snake Hill (Ll); Newark (Soc); rare.

- P. lomatus* Er. Common throughout the State all season.
- P. cunctans* Horn. Orange Mts. Westville IV, 27 (Rk).
- P. brunneus* Grav. Common throughout the State.
- P. cyanipennis* Fab. Throughout the State VII-IX, in gilled fungi.
- P. blandus* Grav. Ft. Lee (Bt); Hudson Co. (Ll); Newark (Soc); Westville VI (Brn); Brigantine, Mainland IX (Hn).
- P. sordidus* Grav. Hudson Co. (Ll); Longport VI, 12 (Rk).
- P. cephalotes* Grav. Ft. Lee (Bt); Hudson Co. (Ll).
- P. nigritulus* Grav. Hopatcong (Pm); Ft. Lee (Bt); Hudson Co. (Ll); Gloucester V, Merchantville III (Brn).
- P. microphthalmus* Horn. Throughout the State V-IX; not common.
- P. baltimorensis* Grav. Throughout the State V-IX; not common.
- P. apicalis* Say. Ft. Lee (Bt); Caldwell (Cr); Highlands VII (Sf); Camden, Gloucester Counties (W); Weymouth VIII (Dke); always rare.
- "*P. fuscipennis*" Mann., "*politus*" Fab. is not really an American species.

ACTOBIUS Steph.

- A. cincerascens* Grav. Hudson Co. (Ll); Westville V (Rk).
- A. nanus* Horn. Hudson Co. (Ll); Arlington IV, sweeping (Sf); Camden III, Woodbury IV, Merchantville IX (Brn); DaCosta (W).
- A. patruelis* Horn. Anglesea VII (Sz).
- A. sobrinus* Er. Throughout the State III-VII.
- A. parvus* Horn. Hudson Co. (Ll); Ft. Lee VI, sifting (Sf); Lahaway V, 28.
- A. pæderoides* Lec. Hudson Co. (Ll); Gloucester, Westville V (Brn); Ocean Co. V (Sm); Brigantine Beach VI, IX (div); Anglesea (W).

CAFIUS Steph.

- C. bistratus* Er. Seashore, from Sandy Hook to Anglesea V-IX.
- C. sericeus* Holme. Highlands Beach V, 30, under an old log with the preceding (Sf); Westville V, 4 (Brn).

EULISSUS Mann.

- E. fulgidus* Fabr. (*Xantholinus*) "New Jersey," several records without definite localities or date.

NUDOBIUS Thoms.

- N. cephalus* Say. (*Xantholinus*) Throughout the State; usually common.

GRYOHYPNUS Steph. (XANTHOLINUS Serv.)

- G. obsidianus* Mels. Ft. Lee (Bt); Eagle Rock VI, 5 (Rk); g. d. (W); under rubbish in gardens (Ch), and probably throughout the State.

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- G. ommesus* Grav. Ft. Lee (Bt); Hudson Co. (Ll); Spring Lake, in fungus (Ch); Lakewood (Sm); Riverton V (Dke); Camden, Clementon IV, Iona VI (Brn).
G. fuscus Casey. "New Jersey," rare on sea beaches (Casey).
G. hamatus Say. (*obscurus* Er.) Throughout the State; found all winter sifting and most of the summer.
G. sanguinipennis Lec. Hudson Co. (Ll); seashore from Barnegat to Cape May VII (div).
G. pusillus Sachse. Hudson Co. (Ll).

LEPTACINODES Casey.

- L. flavipes* Lec. (*batychnus* Gyll.) Snake Hill, Arlington, common (Sf).

LEPTOLINUS Kraatz.

- L. rubripennis* Lec. Westville IV, V (Rk); Lahaway V, 28, on cranberry bogs.

DIOCHUS Er.

- D. schaumii* Kraatz. Staten Island (Lg).

DIANOUS Sam.

- D. cærulescens* Gyll. (*chalybeus* Lec.) Staten Island, on stones at foot of a waterfall, IV, XI, abundant (Lg).

STENUS Latr.

- S. bipunctatus* Er. "New Jersey" (U S N M).
S. junco Fabr. Throughout the State, found sifting all winter.
S. femoratus Say. Hudson Co. (Ll); "New Jersey" (U S N M).
S. strangulatus Casey. Lahaway V, 28, on cranberry bogs (Sm).
S. intrusus Casey. Lahaway V, 28, on cranberry bogs (Sm).
S. erythropus Mels. Westville III, 22, Woodbury V, 19 (Rk); Lahaway V, 28 on cranberry bogs (Sm).
S. convictor Casey. South Camden XII, 12 (GG).
S. inornatus Casey. Lahaway V, 28, on cranberry bogs (Sm).
S. pluto Casey. Woodbury VI, 7 (Rk).
S. pumilio Er. (*atomarius* Casey.) Lahaway V, 28, on cranberry bogs.
S. colonus Er. Westville V, 19, Longport VI, 12 (Rk); New Jersey (U M).
S. stygicus Say. "New Jersey" (U S N M); Philadelphia Neck III (Rk).
S. egenus Er. Lahaway V, 28, on cranberry bogs (Sm).
S. sectilifer Casey. Anglesea VII (Sz).
S. pudicus Casey. Camden III (W); Lahaway V, 28, on cranberry bogs.
S. humilis Er. So. Camden XII (GG); Lahaway V, 28 on cranberry bogs.

HEMISTENUS Mots. (AREUS Casey.)

- H. flavicornis* Er. Weehawken V, 2 (Bt); Palisades, Snake Hill V, abundant (Ll); Merchantville V, 30 (Rk).
H. annularis Er. With the preceding, not rare.
H. reconditus Casey. "New Jersey" (U S N M).
H. arcus Er. Woodbury VI, 7 (Rk); Anglesea VII (Sz).
H. punctatus Er. Ft. Lee (Bt); Hudson Co. (Ll); Westville V, VI (Rk); Camden III, Anglesea (W).

EUÆSTETHUS Grav.

- E. americanus* Er. Snake Hill (Sf); Weehawken IV, 2 (Bt); Westville I, 28, and g. d. (W); occurs in fungi; not rare.

GASTROLOBIUM Casey.

- G. floridanum* Lec. "New Jersey" (Casey).
G. convergens Casey. "New Jersey" (Casey).
G. carolinum Er. (*Cryptobium*) Camden III, Westville V (Rk), Anglesea (W).
G. bicolor Grav. Madison (Pr); Hudson Co. (Ll); Spring Lake (Ch); Lahaway on cranberry bogs V (Sm); Anglesea (W). This and following—"Cryptobium."
G. badium Grav. Snake Hill (Ll); "New Jersey" (U S N M).
G. parallelum Casey. "New Jersey" (Casey).
G. lugubre Lec. Brigantine Beach IX, occasional (Hn).

HESPEROBIUM Casey.

- H. pallipes* Grav. (*Cryptobium*) Common throughout the State.
H. cinctum Say. (*latebricola* Nord.) Camden III, Westville V, Woodbury V, VI (Rk); Lahaway V, on cranberry bogs (Sm); Brigantine Beach IX (Hn).
H. cribratum Lec. Hopatcong (Pm); Boonton III, IV (GG); Madison (Pr); Ft. Lee (Bt); Hudson Co. (Ll), Philadelphia Neck III (Rk).

PÆDERILLUS Casey.

- P. littorarius* Grav. (*Pæderus*) Throughout the State, spring and fall, under stones, under rubbish along shore, rarely in fungi.
P. obliteratedus Lec. (*Pæderus*) Brigantine Beach IX, not common (Hn).

LATHROBIUM Grav.

- L. prælongum* Casey. "New Jersey, J. B. S." (Casey).
L. nigrolucens Casey. "Orange, N. J." (Casey).
L. armatum Say. Hopatcong (Pm); Montclair IV, sifting (Sf); Newark (Soc).

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L. simile Lec. Madison (Pr); Ft. Lee (Bt); Hudson Co. (Ll); Westville VI (Rk); Anglesea (W).

L. seriatum Lec. Brigantine Beach IX (Hn).

LITHOLATHRA Casey.

L. cruralis Casey. New Jersey (Casey).

L. confusa Lec. (*Lathrobium*) Camden II (W); Collingswood III (GG).

LATHROBIOMA Casey.

L. othioides Lec. New Jersey (Casey).

TETARTOPEUS Czwi.

T. terminatum Grav. (*Lathrobium punctulatum*) Throughout the State, winter and early spring. The "puncticeps" of last edition belongs here.

DERATOPEUS Casey.

D. nitidulus Lec. (*Lathrobium*) Lahaway V, 28, on cranberry bogs (Sm).

EULATHROBIUM Casey.

E. grande Lec. Westville I, 28 (W); New Jersey (U S N M).

LATHROTAXIS Casey.

L. longiuscula Grav. (*Lathrobium*) Hoboken V (Bt); Hudson Co. (Ll); Arlington IV (Sf); Newark (Soc); Brigantine Beach IX (Hn).

LINOLATHRA Casey.

L. filitarsis Casey. Brigantine Beach IX (Hn); Anglesea II (W). This is the "*Lathrobium dimidiatum*" of the previous edition.

LATHROBIELLA Casey.

L. ventralis Lec. New Jersey (Casey).

L. collaris Er. (*Lathrobium*) Westville VI (GG); Woodbury V, VI, Longport (Rk); Anglesea (W).

MICROLATHRA Casey.

M. pallidula Lec. Staten Island (Casey).

DACNOCHILUS Lec.

D. lætus Lec. (*angularis* Er.) Anglesea (W).

ADEROCHARIS Sharp.

A. corticina Grav. Throughout the State, under bark.

LITHOCHARIS Lac.

L. ochracea Grav. Cosmopolitan; extends from Atlantic to Pacific.

TRACHYSECTUS Casey.

T. confluens Say. (*Lithocharis*) Throughout the State; common.

PSEUDOMEDON Rey.

P. ruficollis Casey. New Jersey (Casey).

P. thoracicum Casey. (*Lithocharis obsoletus*) Anglesea (W).

SCOPÆUS Er.

S. picipes Casey. Sea beaches of New Jersey (Casey).

S. exiguus Er. Madison (Pr).

SCOPÆOPSIS Casey.

S. opaca Lec. New Jersey (Dn); Camden III, 5 (W).

STILICUS Latr.

S. opaculus Lec. New Jersey (U S N M).

S. biarmatus Lec. Newark (Soc).

S. angularis Er. Throughout the State IV, VII.

S. dentatus Say. Hopatcong (Pm); Lahaway V, 28, on cranberry bogs (Sm).

MEGASTILICUS Casey.

M. formicarius Casey. Alpine III, 10, in nest of a red ant (Bt); near Newark, in ant hills; not rare (Soc).

SUNIUS Er.

S. prolixus Er. Newark (Soc); Brigantine Beach IX (Hn).

S. binotatus Say. Chester (Dn); Ft. Lee (Bt); Collingswood III (GG); Westville IV, V (Rk); Anglesea (W).

S. brevipennis Aust. Staten Island V (Ds).

S. longiusculus Mann. Hopatcong (Pm); Ft. Lee, under stones in spring (Bt); Hudson Co. (Ll); Camden, Gloucester Co. (W); Westville V (Rk).

STILICOPSIS Sachse.

S. monstrosa Lec. Ft. Lee, Snake Hill IV, IX, sifting (Sf); Westville I (W).

PINOPHILUS Grav.

P. latipes Grav. Ft. Lee (Jl); Woodbury V, 22 (Rk); Anglesea (W).

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PALAMINUS Er.

- P. normalis* Lec. Anglesea VII (Sz).
P. testaceus Er. Snake Hill (Sf); Eagle Rock VI (Rk); Westville I, sifting (W).

TACHINUS Grav.

- T. memnonius* Grav. Ft. Lee, on mushrooms (Bt); Riverton V, 1, Westville VI, 6 (Brn); Merchantville XI, 16 (Dke).
T. repandus Horn. Camden XII, 12, Anglesea (W).
T. flavipennis Dej. Eagle Rock VI, 5 (Rk); New Jersey (U S N M).
T. fimbriatus Grav. Throughout the State VI-X, common.
T. picipes Er. Collingswood (W).
T. limbatus Mels. Staten Island VI (Ds); Gloucester V (Brn); Anglesea (W).
T. fumipennis Say. Staten Island V (Ds).
T. pallipes Grav. New Jersey III, 27 (Rk), on mushrooms (Bt); Camden, Gloucester Co. (W).

TACHYPORUS Grav.

- T. elegans* Horn. Hopatcong (Pm); Chester (Dn); Madison (Pr). This and the other species in the series mostly in fungi or fermenting sap.
T. jocosus Say. Madison (Pr); Camden and Gloucester Counties (W).
T. chrysomelinus Linn. Ft. Lee (Bt); West Jersey (U S N M); Brigantine Beach IX (Hn).
T. nitidulus Fab. (*brunneus* Er.) Ft. Lee, Weehawken IV, 2 (Bt); Camden and Gloucester Co. (W); New Jersey (U S N M).

CILEA Duval.

- C. silphoides* Linn. Hemlock Falls VII, 4 (Rk).

ERCHOMUS Mots.

- E. ventriculus* Say. Common everywhere in fungi and soft decay.
E. lævis Lec. Anglesea, sifting, all winter (W).

CONOSOMA Kraatz.

- C. littoreum* Linn. Spring Lake (Ch).
C. knoxii Lec. Staten Island (Lg).
C. crassum Grav. Throughout the State, common in fungi on trees, under old leaves and bark, winter and spring.
C. pubescens Payk. Common throughout the State.
C. basale Er. Spring Lake (Ch); Merchantville VI, X (div); National Park V (Dke).
C. opicum Say. Ocean Co., under bark (Sm).

BOLETOBIUS Leach.

- B. niger** Grav. New Jersey, in Jülich Coll. (Lg).
B. dimidiatus Er. Lakehurst (Lg).
B. cingulatus Mann. Madison (Pr); Newark (Soc).
B. intrusus Horn. Spring Lake (Ch); Brigantine mainland IX (Hn).
B. cincticollis Say. Spring Lake (Ch); New Jersey (U S N M).
B. anticus Horn. Ft. Lee (Bt); New Jersey (U S N M).
B. pygmæus Fab. Brigantine mainland IX (Hn).
B. trinotatus Er. Hopatcong (Pm); Ft. Lee (Bt); Highlands (Ch);
 Westville, DaCosta (W); Brigantine IX (Hn); Anglesea VII (Sz).
B. cinctus Grav. Common throughout the State.
 var. **gentilis** Lec. Brigantine mainland IX (Hn).

BRYOPORUS Kraatz.

- B. rufescens** Lec. New Jersey (U S N M).

MYCETOPORUS Mann. •

- M. americanus** Er. Madison (Pr); Spring Lake (Ch); Merchantville V,
 30 (Rk); Anglesea VII (Sz); under old leaves, etc.
M. humidus Say. Lake Hopatcong (Pm).

PSEUDOPSIS Newn.

- P. sulcatus** Newn. Lake Pleasant, on dead fish (Lv fide Sf).

OXYPORUS Fabr.

- O. femoralis** Grav. Hopatcong (Pm); Orange Mts. (div); Ft. Lee (Sf);
 Camden and Gloucester Co. (W); all the species in fungi.
O. austrinus Horn. Madison IX, 12 (Pr).
O. major Grav. Ft. Lee VIII (Bt); Camden and Gloucester Co. (W).
O. rufipennis Lec. Fort Lee (Jl).
O. vittatus Grav. Hopatcong (Pm); Ft. Lee VIII (Bt); Riverton X (GG);
 DaCosta (W); Atco IX, 1 (Brn).
O. bicolor Fauv. DaCosta (W); Brown's Mills IX, Manumuskin X (Dke).
O. lateralis Grav. Ft. Lee VIII (div); Orange Mts. (Rk); Riverton X
 (GG); Camden and Gloucester Co. (W); Atco X (Brn).

BLEDIUS Leach.

- B. pallipennis** Er. Newark (Soc). The species of this genus live in
 sandy shores of streams or ponds and may be obtained by flooding
 their burrows; they are also attracted to light, and most of the
 specimens collected are taken in that way.
B. mandibularis Er. Brigantine and southward along shore to Cape May;
 adults in September.

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- B. brevidens* Lec. Atlantic City (W).
- B. politus* Er. Brigantine, salt marshes IX (Hn); Anglesea (W).
- B. semiferrugineus* Lec. Woodbury V, 22 (Rk); Lahaway V, 28, on cranberry bogs (Sm).
- B. rubiginosus* Er. Woodbury VII, 30 (W).
- B. tau* Lec. Rockaway Beach, L. I., and sure to occur on the Jersey shore.
- B. basalis* Lec. Brigantine, salt meadow IX (Hn); Sea Isle VI, VII (Brn); Anglesea VII, not rare (Sz).
- B. cordatus* Say. Brigantine, salt marshes, common (Hn); Sea Isle V, VI (Brn); Anglesea (W).
- B. neglectus* Casey. New Jersey (Rk).

PLATYSTETHUS Mann.

- P. americanus* Er. Common throughout the State in half dry cow-dung.

OXYTELUS Grav.

- O. nimius* Casey. Point Pleasant (Lv, fide Sf).
- O. sculptus* Grav. Woodbury V, 22 (Rk); on decaying vegetation.
- O. rugosus* Grav. Hopatcong (Pm); New Jersey (U S N M).
- O. pennsylvanicus* Er. New Jersey (U M); Mosholu VII, on human excrement (Sf).
- O. insignitus* Grav. Common throughout the State on cow-dung.
- O. suspectus* Casey. (*nitidulus* Grav.) New Jersey (U M).
- O. tetracarinatus* Block. (*depressus* Grav.) Madison (Pr).
- O. exiguus* Er. Orange Mts. VII, sifting (Sf); Ft. Lee (Bt); Anglesea VII (Sz).

TROGOPHLCÆUS Mann.

- T. arcifer* Lec. New Jersey (U S N M).
- T. 4-punctatus* Say. Camden and Gloucester Co. (W); the species on mud banks or among decaying leaves in muddy swamps.
- T. nanulus* Casey. Cape May (Casey).
- T. pudicus* Casey. Cape May (Casey).
- T. convexulus* Lec. Longport VI, 12 (Rk).
- T. simplarius* Lec. Eagle Rock VII, 5 (Rk); Anglesea VII (Sz).
- T. providus* Casey. Atlantic City, Cape May (Casey).
- T. confusus* Casey. Cape May (Casey).

APOCELLUS Er.

- A. sphæricollis* Say. Snake Hill, So. Orange (Brn); Brigantine Beach IX (Hn).

GEODROMICUS Redt.

- G. brunneus** Say. (*cæsus* Er.) Staten Island (Sf); Gloucester and Camden Co. (W); Cramer Hill V, 30 (Rk).
G. stictus Casey. Staten Island (Sf); is probably the species referred to as "stictus" Müll. in the last edition.

LESTEVA Latr.

- L. pallipes** Lec. Lahaway V, 28, on cranberry bogs (Sm).

OLOPHRUM Er.

- O. obtectum** Er. Madison (Pr); Snake Hill (Sf); Newark (Sf); Merchantville III, IX (div); Collingswood IV (Brn).

HOMALIUM Grav.

- H. repandum** Er. Lahaway V, 28, on cranberry bogs (Sm).
H. floralis Payk. (*rufipes* Grav.) New Jersey (U S N M).

MEGARTHURUS Steph.

- M. sinuaticollis** Lac. Lake Pleasant on dead fish (Lv, fide Sf).

LISPINUS Er.

- L. exiguus** Er. Fort Lee (Bt).
L. proluxus Lec. Mosholu (Sf).

GLYPTOMA Er.

- G. costale** Er. Ft. Lee (Bt); not rare under bark of trees, g. d.

TRIGA Fauv.

- T. picipennis** Lec. Snake Hill, Highlands (Sf); Philadelphia VII (Rk).

ELEUSIS Lap.

- E. pallidus** Lec. Snake Hill, sweeping at dusk (Sf).

MICROPEPLUS Latr.

- M. cribratus** Lec. New Jersey (B); Greenwood Lake V, 26 (Gr).

Family **TRICHOPTERYGIDÆ**.

These are extremely minute species, living in decaying vegetable matter, often in excrement and occasionally in fungi. They are often somewhat flattened, have the hind wings slender, with long fringes, and are of no economic importance.

PTILIUM Er.

- P. hornianum** Matth. Anglesea VII (Sz).

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PTENIDIUM Er.

- P. evanescens* Marsh. Staten Island (Lg), and will probably be found throughout the State.
P. ulkei Matth. Cape May VII (Sz).
P. atomaroides Mots. Cape May VII, strictly maritime (Sz).

LIMULODES Matth.

- L. paradoxus* Matth. "New Jersey" (Lg).

TRICHOPTERYX Kirby.

- T. mœrens* Matth. Camden III, 4, Gloucester II, 7, sifting (W).
T. haldemanni Lec. Anglesea VII (Sz); g. d., common (W).

NEPHANES Thom.

- N. læviusculus* Matth. Camden, Gloucester, sifting (W).

Family SCAPHIDIIDÆ.

A small group of generally black shining beetles, sometimes marked with red or yellow spots, living in rotten wood, fungi, and the like; therefore not of economic importance. They are most abundantly found in winter under leaves, in rubbish and in dead wood.

SCAPHIDIUM Oliv.

- S. quadriguttatum* Say. Throughout the State mostly before VI, but isolated examples in late VIII. The varieties "obliteratum" Lec., "piceum" Mots., and "4-pustulatum" Say occur with the type; sometimes replacing it, or as exceptions.

BÆOCERA Er.

- B. speculifer* Casey. Westville I, 28 (W).
B. apicalis Lec. Camden, winter, sifting (W); Lahaway V, 28 (Sm).

SCAPHISOMA Leach.

- S. convexum* Say. Throughout the State; winter and early spring.
S. punctulatum Lec. Lake Hopatcong (Pm).
S. rufulum Lec. Newark district (Bf).

TOXIDIUM Lec.

- T. gammaroides* Lec. Orange Mts., Woodside, Newark III, IV (Bf); Snake Hill, Arlington, Highland (Sf); Jamesburg VII (Sm).

Family PHALACRIDÆ.

Small, black, shining beetles of very convex form, living on flowers or under bark, and of no economic importance.

PHALACRUS Payk.

P. politus Mels. Boonton VI, Split Rock Lake IX (GG); Ft. Lee, Snake Hill, Newark VII (Sf); Arlington (Bf); Ocean Co. V (Sm); Iona VI, 16 (Dke). It is probable that the "pumilio" of the last edition is this same species.

OLIBRUS Er.

- O. semistriatus** Lec. New Jersey (Sf).
- O. neglectus** Casey. New Jersey (Sf).
- O. lecontei** Casey. Clementon (Li); "Atlantic States" (Casey).
- O. pallipes** Say. Orange Mts. (Bf); Lahaway V, VI (Sm).

The "O. rufipes" Lec. of the previous list is an error.

EUSTILBUS Sharp.

- E. apicalis** Mels. (consimilis Marsh.) Throughout the State, almost every month in the year.
- E. nitidus** Mels. Throughout the State, in excrement, on dead wood and vegetable decay.
- E. subalutaceus** Casey. Cape May (Casey).

LITOCHRUS Er.

- L. pulchellus** Lec. Woodbury VIII, 7, sifting (W).
- L. immaculatus** Casey. "New Jersey" (Casey).

Family CORYLOPHIDÆ.

Very small species, varying in shape, black or brown, marked with yellow, among fermenting sap, in rotting fruits or in decaying vegetation. May also be beaten from dead branches or found hiding under bark and are not of economic importance.

SACIUM Lec.

- S. amabile** Lec. Fort Lee (Sf); Anglesea VII (Sz).
- S. fasciatum** Say. Orange Mts. (Bf); Ft. Lee (Sf); Newark (Soc); Jamesburg V, 10 (Sm); Anglesea VII (Sz).
- S. lunatum** Lec. Ft. Lee, Snake Hill (Sf); Orange Mts. (Bf); Anglesea VII (Sz). The record for "splendens" Sz. is an error in determination.

ARTHROLIPS Woll.

A. misellus Lec. Palisades (Sf); Eagle Rock (Bf).

CORYLOPHODES Matth.

C. truncatus Lec. Anglesea (W).

C. marginicollis Lec. Hopatcong (Pm); Ft. Lee (Sf); Orange Mts. (Sm).

SERICODERUS Steph.

S. flavidus Lec. Fort Lee (Sf).

RHYPOBIUS Lec.

R. marinus Lec. Snake Hill, Arlington, sweeping VI (Sf); along shore, Brigantine to Cape May V-IX, sifting drift on beach.

ORTHOPERUS Steph.

O. glaber Lec. Camden and Gloucester Co. (W); Lahaway V, 28, on cranberry bogs (Sm); Anglesea VII (Sz).

O. scutellaris Lec. Anglesea VII (Sz).

Family COCCINELLIDÆ.

These are the "lady bugs" or "lady birds" or "lady bird beetles," which are among nature's most effective checks to scale and plant lice increase. They are more or less hemispherical in shape, sometimes a little more oval in outline, and then usually less convex. In color they are as a rule red or yellow with black spots, or black with red and yellow spots. In a very general way, and subject to many exceptions, those of the first type are feeders on plant lice, while those of the second type feed on scale insects; the smaller, black species are usually scale destroyers. The larvæ are rather slender, more or less fusiform in outline, sometimes with lateral processes, often prettily marked with black, blue or orange. In its predatory habits the family is somewhat exceptional among the "Clavicorns," and one of our species departs from the usual habits and is a vegetable feeder. Most of the species are widely distributed, their occurrence being chiefly determined by the presence of the insects upon which they feed.

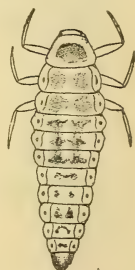


Fig. 95.—
Coccinellid
larva.

ANISOSTICTA Dup.

A. strigata Thunb. Chester (Dn); Snake Hill V, 17 (Bf); Hudson Co. (Li); Arlington VI (Sf); Westville (Li); Merchantville IV, 24 (Brn); Camden Co. IV, 14 (GG).

- A. seriata** Mels. (*Næmia*) Snake Hill V, 17 (Bf); Newark (GG); found in numbers during spring, in swamps, Merchantville and Westville (W); Anglesea VI, Beach Haven VI, VII (Coll); often found in the wash-up along the shore, and locally common on aphid-infested golden rod all along our Southern Coast line.

MEGILLA Muls.

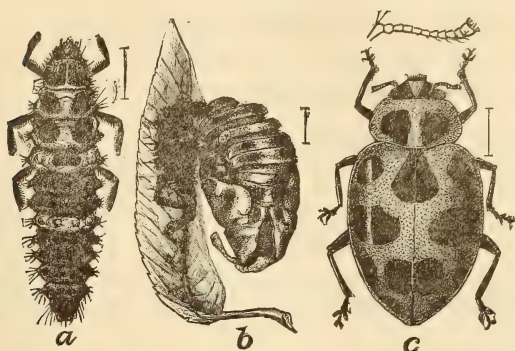


Fig. 96.—*Megilla fuscilabris*: a, larva; b, pupa; c, adult; enlarged.

- M. fuscilabris** Muls. (*maculata* DeG.) Throughout the State and more or less generally throughout the season. Hibernates as an adult, sometimes in great masses, and has rather a wide range of food, including pollen and fungus spores, as well as plant lice and other soft insects.

HIPPODAMIA Muls.

- H. glacialis** Fabr. Throughout the State, locally and seasonably abundant. This is one of the most effective enemies of plant lice in general, and is always present when there is any abnormal increase of destructive species, as, for example, the melon louse.
- H. convergens** Guer. Occurs with the preceding; is locally even more abundant, and has the same general habits.
- H. 13-punctata** Linn. Split Rock Lake IV, Clifton VII (GG); Ft. Lee (Bt); Caldwell (Cr); Newark Dist. VI, VII, IX (Sf).
- H. parenthesis** Say. Throughout the State, all seasons, with much the habits of "*glacialis*."



Fig. 97.—*Hippodamia convergens*, larva, pupa and adult.

ADALIA Muls.

- A. bipuncta** Linn. The commonest and most widely distributed of our species; will even get into greenhouses and on house plants to feed on the aphids there found. It is not infrequently considered the author of the injury caused by plant lice.
- A. humeralis** Say. Masonville VI, 16 (Castle).

COCCINELLA Linn.

- C. 9-notata* Hbst. Common throughout the State and a general feeder on plant lice of all kinds.
- C. trifasciata* Linn. Boonton VII (GG); Madison (Pr); Hoboken (Sf); Newark Dist. (Bf); Jamesburg V, 15 (Coll); Toms River (Bt). Not a common species in New Jersey; more abundant northwardly.

CYCLONEDA Crotch.

- C. sanguinea* Linn. Throughout the State; more or less common everywhere. A general feeder on plant lice.

NEOHARMONIA Casey.

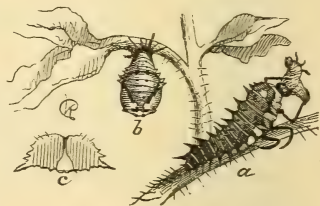
- N. venusta* Mels. Atlantic City, in wash-up (Sherman); a southern species.

HARMONIA Muls.

- H. picta* Rand. Throughout the State V-VIII, but local; on pine trees, end of April (W); abundant in its season (Lg).

ANATIS Muls.

- A. 15-punctata* Oliv. Reported from all parts of the State and locally and seasonally common. Feeds on plant-lice generally and on many other soft-bodied insects; especially important as a check to the plant-louse that often infests Norway Maples in early summer.



NEOMYSIA Casey.

- N. pullata* Say. Hopatcong (Pm); Orange Mts. (div); Clifton VIII, Riverton V, Clementon V (GG); Westville (Li); Lahaway IX (Coll); on pine trees IV, V (W).



Fig. 98.—15-spotted "lady-bird":
a, larva devouring slug of
potato beetle; b, pupa; d
to g, variations of
adult.

PSYLLOBORA Chev.

- P. 20-maculata* Say. Common locally throughout the State.

EPILACHNE Chev.

- E. borealis* Fabr. The "Squash lady-bird"; feeds in all its stages on cucurbs, but preferably on squash, and occasionally causes noticeable injury. It is the one exception in our State to the predatory habit of the family, and is readily recognizable by its large size and large black spots on a yellow ground. It succumbs readily to the arsenites.

AXION Muls.

- A. tripustulatum.** DeG. Woodside (Bf); Riverton VI, IX, feeding on San José Scale (Sm); DaCosta on pines IV, V, VIII (div); Atlantic City (Li); sometimes very plentiful at Lakehurst on post oaks infested by "Kermes pubescens" Bogue, VIII, IX (Ds). This is a scale feeder and locally and seasonally common; but while I have found it feeding on the San José Scale, this seems to be an accidental and occasional habit, and it has not manifested any intention of adding this species to its regular diet.

CHILOCORUS Leach.

- C. bivulnerus** Muls. Throughout the State, locally common; is a scale feeder and has devoted itself especially to the San José Scale, of which it destroys great numbers. Unfortunately it is a slow breeder, with only a single annual generation, and hence does not suffice to keep the scale in check.
- C. similis** Rossi. This is the "Chinese or Asiatic lady-bird" introduced to supplement the preceding as a check to the San José Scale. It was maintained for part of two years at New Brunswick, and a considerable number was liberated at various points in South Jersey; but there is no evidence that the insect has really established itself. The name is introduced here chiefly to record the attempted introduction.

EXOCHOMUS Redt.

- E. marginipennis** Redt. Milltown V (Coll); Clementon V (GG); DaCosta (Li); g. d., rare (W).
- E. 4-pustulata** Linn. Rutherford VIII, 10, found while inspecting conifers in a nursery, one example only. It is a European species and probably a recent introduction (Sm).

BRUMUS Muls.

- B. septentrionis** Weise. var. *davisi* Leng. Milltown IV, 22 (Coll); Jamesburg, Lakehurst, common in spring on pines infested with plant lice.

DELPHASTUS Casey.

- D. pusillus** Lec. Ft. Lee, Snake Hill (Sf); Orange Mt. Dist. V (Bf); Buena Vista (Li).

BRACHYACANTHA Chev.

- B. ursina** Fabr. Common throughout the State VI-VIII.
- B. 10-pustulata** Mels. With the preceding; but less common.
- B. basalis** Mels. "New Jersey" (Li); Mr. Leng suggests that this record may refer to the next species.
- B. 4-punctata** Mels. Lakehurst IX, 4 (Lg).
- B. dentipes** Fab. Woodbury (Li); Anglesea (W).
- B. indubitalis** Cr. Hewitt, Plainfield (Lg).

HYPERASPIS Chevr.

- H. bigeminata* Rand. Jamesburg IV, 18 (Coll); Atco (Li); Lakehurst IX, 5 (Lg).
H. pratensis Lec. Hopatcong, in Dietz Coll. (Sf).
H. signata Oliv. Common throughout the State. Feeds on the cottony maple scale, and is the most effective check to that species. Also feeds on "Pseudococcus" and probably other soft scales.
H. binotata Say. Atlantic Co., rare (W); found on pine trees in spring, on willow in summer; not rare (Lg).
H. proba Say. Throughout the State, locally not rare.
H. lewisi Cr. "New Jersey," one example only (W).
H. fimbriolata Mels. Throughout the State, Jersey City to Cape May V-VII.
H. undulata Say. Jersey City to Camden and Cape May IV-VIII.

SMILIA Weise.

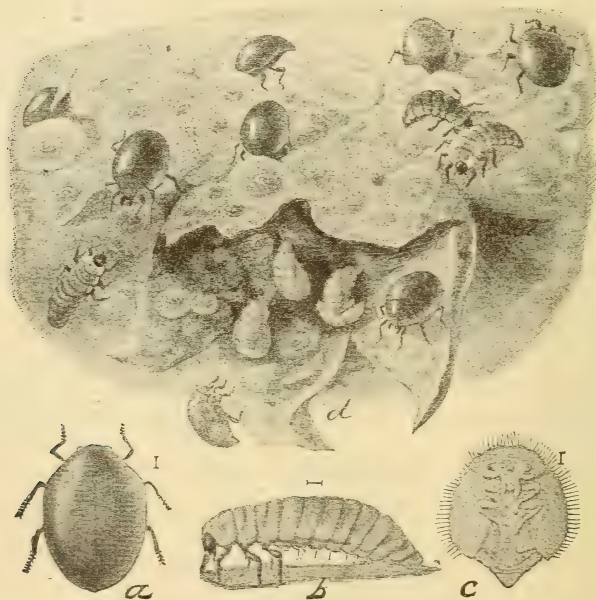


Fig. 99.—*Similia misella*: a, adult; b, larva; c, pupa; d, larva and adult feeding on the pernicious scale in calyx cup of pear; all much enlarged.

- S. misella* Lec. Throughout the State, locally common on trees infested by the pernicious scale. It is one of the important controls of the scale, but has never been sufficiently abundant anywhere to get the better of it.

STETHORUS Weise.

- S. punctum** Lec. Jamesburg VII, 15 (Coll); Spring Lake (Ch); Iona VI, 16 (Dke); g. d. (Li). This is the smallest of our species, and will probably be found to occur throughout the State.

SCYMNUS Kug.

- S. fraternus** Lec. Elizabeth XI, 27 (GG); g. d., rare (Li).
S. brullei Muls. Fort Lee (Sf).
S. hemorrhous Lec. Orange Mts. (Bf); Cape May Court House (W); Lakehurst IX, 5 (Lg).
S. chromopyga Casey. Lakehurst IX, 5 (Lg).
S. cervicalis Muls. Ft. Lee (Sf); Spring Lake (Ch); "New Jersey" (Li).
S. caudalis Lec. Orange Mts. (Bf); Lahaway (Coll).
S. collaris Mels. Ft. Lee (Sf); South River VII, 2 (Coll); Jamesburg (Lg); Iona VI, 8 (Dke); DaCosta, Anglesea (W); g. d. (Li).
S. indutus Casey. Greenwood Lake VI, 21 (Lv).
S. puncticollis Lec. Still only a probable inhabitant of the State.
S. lacustris Lec. South River VII, 5 (Coll).
S. tenebrosus Muls. Spring Lake (Ch); Jamesburg V, 17, Lahaway, on cranberry bogs V, 28, X, 14, Lakehurst VIII, 18 (Coll); DaCosta V (Dke).
S. punctatus Mels. Ft. Lee, the black form (Sf); g. d., in Newark district (Bf); Buena Vista (Li).
S. nanus Lec. Fort Lee (Sf); South Orange VII, 4 (Lv).
S. punctum Lec. Boonton VI, 18 (GG).
S. americanus Muls. Boonton VI (GG); Fort Lee (Sf); Orange Mt. Dist. (div); Jamesburg VII, IX (Coll); Atco (Li); DaCosta, Cape May C. H. (W).
S. flavifrons Mels. var. **bioculatus** Muls. Much like the preceding in distribution.
S. intrusus Horn. Newark VIII, 30 (Bf).
S. myrmedon Muls. Pennsylvania, and probably New Jersey.
S. liebecki Horn. Buena Vista (Li); DaCosta VII, 20 (Brn); Lakehurst (Lg).
S. terminatus Say. Fort Lee (Sf); Newark district III, V (Bf); Camden to Seaville III, IV, VI, VII, XII (Brn); g. d. (W).
S. xanthaspis Muls. Newark Dist. III, 7, VII, 26 (Bf).

"*S. paludicola*" Sz. is a Floridian species, and the name is not sanctioned by description. The species of this genus are very small, convex, hairy black beetles, with obscure orange, yellowish or brown markings, and most of them are feeders on scale insects. They do not occur in sufficient numbers, however, to be of any decisive service.

CEPHALOSCYMNUS Cr.

- C. zimmermanni** Cr. Orange Mts., Woodside (Bf); Anglesea VII (W); feeds on the scurfy scale (Sz).

COCCIDULA Kug.

- C. lepida** Lec. Gloucester and Camden Cos., locally common in winter swamp collections (div); hibernates as adult, and occurs until June or July.

Family **ENDOMYCHIDÆ.**

Somewhat resemble the Coccinellids, but are as a rule longer and less convex. They are almost exclusively feeders on fungi in both larval and adult stages, and not of importance from the economic standpoint.

MYCETÆA Steph.

- M. hirta** Marsh. Ft. Lee IX, 9, under bark (Jl); Orange Mts. (Bf); Staten Island III, in decaying, fungus-covered stumps (Ds).

RHANIS Lec.

- R. unicolor** Ziegl. Throughout the State, locally common IV-VIII, under old bark.

PHYMAPHORA Newn.

- P. pulchella** Newn. Madison (Pr); Caldwell (Cr); Ft. Lee (Sf); Palisades IV, 29 (Bno); Newark (Soc).

LYCOPERDINA Latr.

- L. ferruginea** Lec. Throughout the State V, VI, breeds in puff-balls, and also found on fungus under bark.

APHORISTA Gorb.

- A. vittata** Fab. Throughout the State in spring, on mold and other fungi under bark and in decaying logs.

MYCETINA Muls.

- M. perpulchra** Newn. Palisades, Orange Mts., Newark (Bf).
M. testacea Ziegl. Hewitt VI, 2 (Jl); Millburn (Bf); DaCosta (W); Seashore (Li); always rare; beaten from dead branches.

STENOTARSUS Perty.

- S. hispidus** Hbst. Throughout the State, spring and fall, on dead branches of pine and other trees.

EPIPOCUS Germ.

E. bivittatus Gerst. Newark, rare (Bf).

ENDOMYCHUS Panz.

E. biguttatus Say. Throughout the State, spring and fall, locally common, under bark on fungus.

Family **EROTYLIDÆ**.

As the family stands in our lists at present, it comprises species of two quite different types. The "Languriinæ," which are long, slender and somewhat cylindrical, and the "Erotylinæ," which are shorter, more robust, tapering to the end of the wing-covers. The former are feeders in the stems of living plants, the latter are found in fungus and under the bark of trees. These are sometimes regarded as representing distinct families, while others include under the one heading also the "Cryptophaginæ" and "Atomariinæ." It has not been deemed advisable to advocate either proposition here, and therefore the list has been left essentially as in the last edition.

LANGURIA Latr.

- L. bicolor** Fab. Newark (Soc); Camden (W); Westville (Li); Brigantine Beach, IX.
- L. mozardi** Lec. Throughout the State, locally not rare; the larva is a borer in "Compositæ," and sometimes injurious as a clover stem borer.
- L. discoidea** Lec. "New Jersey," probably Chester (Dn).
- L. tædata** Lec. Hopatcong (Pm); Hudson Co. (Ll); seashore from Brigantine to Cape May VI, VII (div).
- L. angustata** Beauv. Throughout the State in spring.
var. *trifasciata* Say. Arlington IV, VI, sweeping and under stones (Sf); salt meadows in spring under stones (Bf); Camden XII-III sifting (div); g. d. in wet places, sweeping (W).

ACRAPTERYX Gorb.

- A. gracilis** Newn. Throughout the State VI-VIII, not common; larva in stems of "Compositæ" (Ch).

DACNE Latr.

- D. 4-maculata** Say. "New Jersey" (Li); on white fungi on old logs (Ch).

MEGALODACNE Cr.

- M. fasciata** Fab. Throughout the State, under old bark infested with fungi.

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ISCHYRUS Lac.

- I. 4-punctatus Oliv. Caldwell (Cr); Westville IV, 29 (Brn).

MYCOTRETUS Lac.

- M. sanguinipennis Say. Staten Island (Lg); Plainfield on beech fungus (Sf).
M. pulchra Say. Hudson Co. (Ll); Woodside, once common (Bf).
M. dissimulator Cr. Newfoundland (Lg).

TRITOMA Fab.

- T. humeralis Fab. Throughout the State VIII, IX, on fungi.
T. biguttata Say. With the preceding, VII-IX.
T. angulata Say. Hudson Co. (Ll); Woodside, Orange Mts., rare (Bf); Clementon VII, 26, VIII, 6 (GG).
T. unicolor Say. Throughout the State; common on fungi.
T. thoracica Say. Throughout the State V-IX; not common.
T. flavicollis Lac. With the preceding, but common.

Family COLYDIIDÆ.

Usually brown in color, slender or somewhat flattened, often with ridged wing-covers. Live largely on dead or dying trees, and some of them devour the larvæ of woodboring beetles.

SYNCHITA Hellw.

- S. obscura Horn. Orange Mts. (Bf); Anglesea V, VII (div); on red oak.
S. fuliginosa Mels. Ft. Lee, common (Jl); Hudson Co. (Ll); Orange Mts. (Bf); under bark of dead branches.

CICONES Curt.

- C. marginalis Mels. Newark at lights (Bf).

DITOMA Ill.

- D. quadriguttata Say. Throughout the State IV, V, under bark; rare.
D. pinicola Schaef. Lakehurst IX (Sf); the type locality.
D. quadricollis Horn. Woodbury V, 22 (GG); Anglesea V, 30 (W).

COXELUS Latr.

- G. guttulatus Lec. Ft. Lee in spring (Jl); Westville (Li); Clementon III, 18 (Brn); Waretown III, 3 (W); on fungus under bark and on dead branches; rare.

AULONIUM Er.

- A. parallelipedum** Say. Hudson Co. (Ll); Westville V, 23 (Brn); under bark and in twigs of coniferous and deciduous trees.
- A. tuberculatum** Lec. Newark (Bf); Malaga VI, 1 (GG); Iona X, 14 (W).

COLYDIUM Fab.

- C. lineola** Say. Throughout the State III-VIII, under bark; rare.

OXYLÆMUS Er.

- O. americanus** Er. Fort Lee VI, 8-19 (Jl).

PENTHELISPA Pasc.

- P. hæmatodes** Fab. Ft. Lee (Jl); Malaga VI, VII (GG); Anglesea (W); under moist bark of dead pines.
- P. reflexa** Say. Lakehurst V, 22 (Jl).

PYCNOMERUS Er.

- P. sulcicollis** Lec. Woodside IV, 3, rare (Bf).

BOTHRIDERES Er.

- B. geminatus** Say. Boonton III, 13 (GG); Ft. Lee III, 14, under dead hickory bark (Jl); g. d. (Li); also occurs under dry oak bark.

CERYLON Latr.

- C. castaneum** Say. Highlands, Snake Hill (Sf); Hudson Co. (Ll); salt meadows (Bf); Riverton IV, V (GG); Gloucester IV, 20 (Brn); Lake-wood (Coll); g. d. (W); rare at all points.

PHILOTHERMUS Aubé.

- P. glabriculus** Lec. Throughout the State IV-VII, in decayed wood.

Family RHYSSODIDÆ.

CLINIDIUM Kirby.

- C. sculptile** Newm. New Brunswick, Lahaway (Sm); Camden, Gloucester Co. (W); g. d. (Li); long slender brown species with ridged prothorax, found under bark and of no economic importance.

Family CUCUJIDÆ.

Small or moderate sized species, narrow, flat, fitted to live under bark, where most of them are found. Some of them are carnivorous in habit,

others occur in granaries and among stored products of various kinds. None of them attack living plants, and cleanliness, assisted by carbon disulphide, intelligently applied, will usually prevent loss on the dried stock.

SILVANUS Latr.

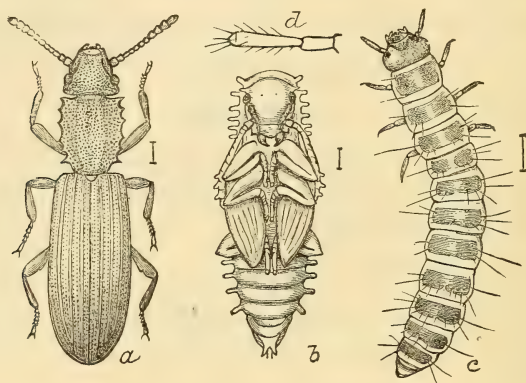


Fig. 100.—*Silvanus surinamensis*: a, adult; b, pupa; c, larva; enlarged.

- S. surinamensis** Linn. Throughout the State, in stored grains, dried fruits, etc.; common in mangers in stables and in bakeries.
- S. bidentatus** Fab. Throughout the State; under bark; not rare; taken most of the season.
- S. planatus** Germ. Hudson Co. (Li); Orange, under pine bark (Ch); Newark Dist., g. d. (Bf); Brigantine IX (Hn).
- S. imbellis** Lec. G. d., not rare (Li); Anglesea (Sm).

CATHARTUS Reich.

- C. advena** Walth. Throughout the State; rare under bark; more common in stored grain, fruit, nuts, etc., particularly such as are spoiled.

NAUSIBIUS Redt.

- N. clavicornis** Kug. (*dentatus* Marsh.) Ft. Lee (Jl); Newark (Bf); g. d. (Li); under bark, and also occasionally in store-houses.

CATOGENUS Westw.

- C. rufus** Fab. Throughout the State, under bark of trees, but local and not usually common.

PEDIACUS Shuck.

- P. depressus** Hbst. Newark, rare (Bf).

CUCUJUS Fab.

C. clavipes Fab. Throughout the State, under bark; the larva predatory.

LÆMOPHLCÆUS Lap.

L. biguttatus Say. Throughout the State, under bark; fall to mid-summer.

L. fasciatus Mels. Newark, rare (Sf); Anglesea VII (Sz).

L. modestus Say. Jamesburg V, under bark (Sm); Westville I, sifting (W).

L. convexulus Lec. Clifton V, 24 (GG); Hudson Co. (Ll); Newark (Bf).

L. adustus Lec. Hudson Co. (Ll); Newark (Bf); Jamesburg V, 10 (Sm); Collingswood IV, 17 (Brn).

L. testaceus Fab. Hudson Co. (Ll); Newark (Bf).

L. alternans Er. Cosmopolitan, found everywhere (Casey).

L. ferrugineus Steph. Merchantville V, 7 (Brn); also cosmopolitan.

All of these species really occur throughout the State, although there are no specific records for some of them, and the greater number may be found under somewhat moist, rather closely adherent bark.

LATHROPUS Er.

L. vernalis Lec. (not *ventralis*) Throughout the State V-VII, beating dead oak branches.

DYSMERUS Casey.

D. basalis Casey. Red Bank, in Gloucester Co., I (W).

BRONTES Fab.

B. dubius Fab. Throughout the State III-VI.

B. debilis Lec. Hudson Co. (Ll); English Creek IX (Bland).

These species probably occur throughout the State, and are not well separated in collections. "Debilis" is said to be more northern in its range, while "dubius" is more southern.

TELEPHANUS Er.

T. velox Hald. Throughout the State, under stones and old leaves; rarely under bark; may be sifted out from fall to late spring.

Family **CRYPTOPHAGIDÆ.**

Small clavicorn beetles, living in fungi and decomposing vegetable matter, yellow to blackish in color, sometimes banded, flattened below, and not very convex above. They are of no economic importance, and are not well known.

TELMATOPHILUS Heer.

- T. americanus** Lec. Throughout the State IV-VI, locally common, sweeping in low meadows or marsh land.

LOBERUS Lec.

- L. impressus** Lec. Throughout the State, all summer, sweeping in damp or swampy meadow land at dusk.

TOMARUS Lec.

- T. pulchellus** Lec. Throughout the State; not rare; taken by sifting in winter; spring and fall under leaves, chips, etc., in marsh or low meadows.

ANTHEROPHAGUS Latr.

- A. ochraceus** Mels. Orange Mts. VII (div); Bloomfield (Bf); Hudson Co. (Ll); Westville (Li); on flowers; is an inquiline in nests of bumblebees.

CRYPTOPHAGUS Hbst.

- C. cellaris** Scop. Spring Lake, in cellars (Ch).
C. croceus Zimm. Newark, rare (Bf).
C. 4-dentatus Mann. New Brunswick (Coll).

CROSIMUS Casey.

- C. obesulus** Casey. Greenwood Lake VI, sifting rotten leaves (Sf).

ATOMARIA Steph.

- A. vespertina** Mäkl. Snake Hill (Sf).
A. lætula Lec. Ft. Lee, Snake Hill, Arlington, sweeping at dusk (Sf).
A. ochracea Zimm. Snake Hill, common (Sf).
A. ephippiata Zimm. Common throughout the State all season.

EPHISTEMUS Steph.

- E. apicalis** Lec. Snake Hill XI, Arlington VI, sweeping at dusk (Sf).

Family MYCETOPHAGIDÆ.

Oblong or oval beetles of small or moderate size, brown or black, with obscure yellow mottlings or markings, more or less coated with silky hair. They are found under bark and in fungus growths, and are neither beneficial nor harmful to the agriculturist.

MYCETOPHAGUS Hellw.

- M. punctatus** Say. Throughout the State, locally common, in fungus on oak and elsewhere under bark.
M. flexuosus Say. With the preceding and similar in habit.

- M. bipustulatus* Mels. Eagle Rock, 1 specimen (Bf).
M. pluriguttatus Lec. Newark district in fungus (Bf).
M. melsheimeri Lec. Camden, rare (Li).
M. pluripunctatus Lec. Greenwood Lake (Sf); Westville (Li).
M. pini Ziegl. Westville rare (Li), under pine bark.
M. obsoletus Mels. Avalon (Li); Sea Isle City VI, 11 (Brn).

LITARGUS Er.

- L. 6-punctatus* Say. Hudson Co. (Li); Orange Mts., Newark IX, 20 (Bf); Anglesea VII (Sz); under decomposing vegetable matter and bark.
L. tetraspilotus Lec. Boonton III, 17 (GG); Orange Mts., Newark V, 30 (Bf).
L. didesmus Say. Hudson Co. (Li); DaCosta VI, Sea Isle VI (Brn); Anglesea VII and probably throughout the State.
 The record of "*L. balteatus*" was based on a misidentification.

TYPHŒA Steph.

- T. fumata* Linn. Common everywhere in stables and sweepings from granaries and feed stores (Ch); bred in numbers from dry-rotting potatoes at New Brunswick.

Family DERMESTIDÆ.

Stout, heavily built beetles, with short, weak legs that may be very closely folded to the body. Clothed with flattened hair or scales, usually black and white mottled; but sometimes marked with red, brown or yellow. The larvæ are elongate, hairy creatures, with tufts of bristles at the end of the abdomen and sometimes along the sides; or with bunches of hair that may be erected or spread out. They feed (with one exception) on stored or dry animal and sometimes vegetable products, and include such pests as the "larder beetles," "museum beetles," "carpet beetles," etc., and are therefore decidedly injurious. Protection is gained by the use of repellants like camphor and naphthaline, and by cleanliness or making access impossible to larvæ or adults. As a rule a combination of both methods is employed, and occasionally bisulphide of carbon can be used to advantage.

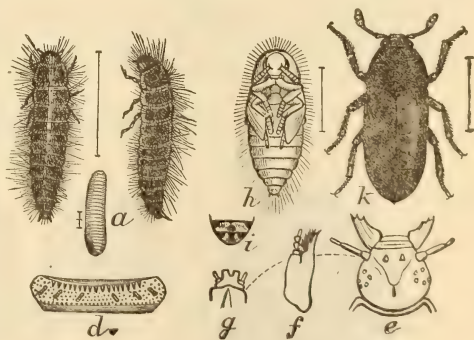


Fig. 101.—*Dermestes vulpinus*: a, larva from above and side; b, pupa; c, adult; enlarged: other figures refer to structural details of larva.

BYTURUS Latr.

- B. unicolor** Say. Throughout the State, adult in flowers; larva a whitish maggot in fruits, chiefly of raspberry; the one exception in our fauna to the feeding habits detailed in the opening paragraph. Sometimes this genus is made the type of a distinct family.

DERMESTES Linn.

- D. caninus** Germ. Throughout the State V, VII, IX, under dead animals, sometimes rather common; not usually in houses.
- D. lardarius** Linn. The "larder beetle," common throughout the State, often on stored provisions. Kill the beetles and larvæ whenever seen, keep provisions in tight or screened receptacles, and, where the insects are abundant, trap them on easily accessible scraps.
- D. vulpinus** Fab. Throughout the State under old bones and dried carcasses; also in skins and leather, hence known to manufacturers as the "leather beetle"; gasoline and carbon disulphide may be used.
- D. frischii** Kug. Riverton IV, Burlington Co. VI (GG); seashore (Li); Brigantine Beach IX (Hn); locally not rare; but not a troublesome form.

ATTAGENUS Latr.

- A. piceus** Oliv. Throughout the State, common; the "black carpet beetle." Also said to attack cereals and other seeds. Gasoline and carbon disulphide are used for their destruction, and naphthaline may be used as a repellent.

TROGODERMA Latr.

- T. ornatum** Say. Caldwell (Cr); Orange Mts. VI, 9, on flowers (Bf).
- T. tarsale** Mels. Throughout the State. "Sometimes injurious to cereals and other seeds, to cayenne pepper, and very troublesome in collections of insects or other objects of natural history" (Ch).

ANTHRENUS Geoffr.

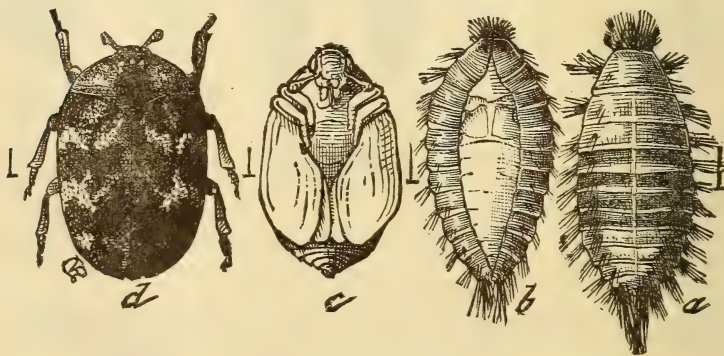


Fig. 102.—The carpet beetle, *Anthrenus scrophulariæ*: a, larva; b, pupa formed in larval skin; c, pupa; d, adult; all much enlarged.

- A. scrophulariæ** Linn. The "carpet beetle," known in the larval stage as the "Buffalo moth." Adults hibernate and are common on flowers in spring; the larvæ infest woolens chiefly. From stored clothing they can usually be kept with naphthaline; infested carpets should be removed and cleaned if possible and the floors thoroughly scrubbed. If removal is not possible, drench with gasoline twice at intervals of ten days, or press the infested areas with a very hot flat-iron over a wet cloth so as to drive a steam through the texture.
- A. verbasci** Linn. The common Museum pest, injuring dried animal and vegetable products of all kinds. In collections naphthaline is used as a repellent.
- A. musæorum** Linn. Less common than the preceding and not injurious in this country.

CRYPTORHOPALUM Guer.

- C. ruficorne** Lec. Common on flowers in Ocean County.
- C. triste** Lec. Throughout the State on flowers, spring and fall.

ORPHILUS Er.

- O. niger** Rossi. (*glabratus* Fab.) Not rare on flowers, g. d.

Family HISTERIDÆ.

This family is recognizable by the usually short, chunky form, shining black color, the elytra squarely cut off behind so as to leave the end of the abdomen exposed. The legs are short, the tibiæ broad and flat and fitted for digging. When disturbed, the beetles fold these legs so close to the body that they are practically invisible. The antennal club is short and rounded or capitate. The adult beetles are found in or under decaying



Fig. 103.—*Hister arcuatus* and *H. bimaculatus*; much enlarged.

animal or vegetable matter, in excrement or in fungi. A few of them are more oblong and flattened, and these live under bark and generally in moist places. The larvæ as a rule occur in similar situations.

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Although the circumstances under which the insects occur suggest that they are scavengers, it is certain that some and perhaps most of them are really predatory, feeding upon other genuine scavengers that occur in such situations.

HOLOLEPTA Payk.

- H. lucida* Lec. Hudson Co. (Ll); Ft. Lee, under bark of chestnut (Bt); also under freshly loosened bark of other trees.
H. fossularis Say. Throughout the State, under bark or in bark layers.

HISTER Linn.

- H. planipes* Lec. Ft. Lee IV (Bt); Belleville III, Woodside IV (Bf); Newark (Dn); found in ant nests and probably preys upon their larvæ.
H. arcuatus Say. Madison (Pr); Newark (Bf); along shore from Sandy Hook to Cape May among drift and in the sand.
H. biplagiatus Lec. West Bergen V (Bf); Westville V (div); g. d. (W); Brigantine Beach IX (Hn); Anglesea VII; not common.
H. harrisii Kirby. Fort Lee (Bt).
H. virginiae Casey. "New Jersey" (Sf).
H. merdarius Hoffm. Hopatcong (Pm); New Brunswick, Anglesea (Coll).
H. interruptus Beauv. Throughout the State, common.
H. stygicus Lec. Staten Island V (Sf).
H. immunis Er. Fort Lee (Bt); Staten Island (Lg).
H. marginicollis Lec. Madison (Pr).
H. unicus Casey. Hewitt, Staten Island, in toad-stools (Sf).
H. cognatus Lec. Palisades IV (Sf); Camden V (GG).
H. umbilicatus Casey. "New Jersey" (Sf).
H. abbreviatus Fab. Common throughout the State under cow-droppings.
 The "fœdatus" of the previous list belongs here.
H. civilis Lec. Camden, Gloucester Co., Cape May C. H. V (W); Brigantine Beach IX (Hn); seashore (Li); not so common.
H. furtivus Lec. Madison (Pr).
H. depurator Say. Ft. Lee (Bt); Hudson Co. (Ll); Newark Dist. (Bf); DaCosta VII (W); Winslow VIII, Brown's Mills IX (Dke); locally common.
H. defectus Lec. Jamesburg (Ds); Lakehurst IX, in mushrooms (Sf).
H. servus Er. Lakehurst IX (Sf).
H. bimaculatus Linn. Throughout the State V, VII, IX, not common.
H. sedecemstriatus Say. Caldwell (Cr); Hudson Co. (Ll).
H. americanus Payk. Ft. Lee (Bt); Hudson Co. (Ll); Newark Dist. (Bf); Brown's Mills VII (Dke); g. d. (W Li).
H. davisii Schaeff. Jamesburg VIII, IX, Lakehurst IX (div); Brookville (Lg).

- H. perplexus* Lec. Newark III, 30, g. d. (Bf).
H. relictus Mars. New Jersey (Sf).
H. exaratus Lec. Brigantine Beach IX, rare (Hn).
H. venustus Lec. Newtonville III, 21, sifting, 1 specimen (Brn).
H. subrotundus Say. Throughout the State, under bark and stones; locally not rare.
H. vernus Say. Orange Mts. V, Newark IX (Bf); 5-mile beach V, and g. d. (W).
 A species taken at Trenton, VI, 2, is probably undescribed, according to Mr. Schaeffer.

PLATYSOMA Er.

- P. saunieri* Mars. Silver Lake, Staten Island (Sf).
P. carolinus Payk. Throughout the State, under bark; like most of the others of this series.
P. lecontei Mars. With the preceding, but more common.
P. aurelianus Horn. Newark (Bf).
P. parallelus Say. Throughout the State, in spring, under bark; predatory upon Scolytids.
P. æquus Lec. Snake Hill (Sf).

CYLISTIX Lewis.

- C. coarctatus* Lec. Staten Island (Lg); Lakewood (Ll).
C. cylindricus Payk. Lakewood VII (div); Jamesburg V, 17 (Coll).
C. attenuatus Lec. Cape May C. H. V, 28, under pine bark, always associated with "Tomicus" (W); Brown's Mills VI, 23 (Dke).

EPIERUS Er.

- E. pulicarius* Er. Camden, Gloucester Co., under bark (W); Merchantville VI, 15 (GG); found also in decaying wood.

HETÆRIUS Er.

- H. brunneipennis* Rand. Hopatcong (Pm); Alpine III (Bt); Orange Mts. (Bf); Newark (GG); always in ant nests, and sometimes common.

ONTHOPHILUS Leach.

- O. alternatus* Say. Staten Island (Lg).

DENDROPHILUS Leach.

- D. punctulatus* Say. Ft. Lee (Sf); Newark V, in rotten elms, rare (Bf); Anglesea V, 14, 1 specimen (Brn).

CARCINOPS Mars.

- C. conjunctus* Say. Snake Hill V, 22, Arlington, Woodside, under stones (Bf); Lakehurst V, 24 (Ds).
- C. geminatus* Lec. Staten Island III (Sf); Brigantine Beach IX, rare (Hn).
- C. 14-striatus* Steph. Snake Hill (Ll); Newark Dist., g. d. (Bf); Brigantine Beach IX (Hn); Cape May C. H. V, 28, under king-crabs (W).

PAROMALUS Er.

- P. æqualis* Say. Snake Hill (Ll); Newark Dist. (Bf); Woodbury III (Brn); Anglesea; under bark like most other members of this genus.
- P. estriatus* Lec. Snake Hill (Ll).
- P. bistriatus* Er. Hopatcong (Pm); Ft. Lee (Bt); Snake Hill (Ll); Newark, g. d., common (Bf).
- P. seminulum* Er. Snake Hill, under bark of freshly cut stumps (Ll).

SAPRINUS Er.

- S. rotundatus* Kug. Anglesea (W).
- S. pennsylvanicus* Payk. Along the seashore and sandy river banks, under carrion and in dung, very common; all season.
- S. oregonensis* Lec. var. *sejunctus* Mars. Paterson V, 28 (Coll).
- S. assimilis* Payk. Throughout the State; usually in excrement.
- S. conformis* Lec. Newark (Bf); Iona V, 26 (Dke); Anglesea (W).
- S. placidus* Er. Highlands (Ch); Sandy Hook VII (Coll).
- S. minutus* Lec. 5-mile beach VII, 4-VIII, 1 (W).
- S. sphæroides* Lec. Westville VII (W); DaCosta VI, 3, Anglesea VI (Brn); Brigantine Beach IX, rare (Hn).
- S. fraternus* Say. Throughout the State; our commonest inland species.
- S. patruelis* Lec. Sandy Hook to Cape May, along shore VII-IX.
- S. dimidiatipennis* Lec. Highlands (Ch) and Sandy Hook to Cape May.

Most of the species of this genus are more common along shore, where they are found in the sand beneath dead fish and other animal matter. There are probably other species, and Mr. Schaeffer has determined that one form, found at Lakehurst, VII, 4, is undescribed.

PLEGADERUS Er.

- P. transversus* Say. Atlantic City (Castle); g. d. (W); found in Scolytid galleries under pine bark.
- P. barbelini* Mars. Newark (Bf); Atco IV, 2 (W).

BACANIUS Lec.

- B. misellus* Lec. Lahaway V, 28, on cranberry bogs (Sm).

ACRITUS Lec.

- A. exiguus** Er. Newark Dist., g. d., in rotten wood (Bf); Anglesea IV, 11 (Coll).

ÆLETES Horn.

- Æ. politus** Lec. Hopatcong (Pm); Ft. Lee (Bt); Lahaway V, 28, on cranberry bogs (Sm); under decaying vegetable matter generally.

Family **NITIDULIDÆ**.

Sap beetles as a rule, although some live in fungi and others in or on dry animal or vegetable matter. In a general way they may be classed as scavengers, and have the short, chunky antennal club usual to such species. The majority are more or less flattened, usually broad in proportion to their length and some of them with somewhat abbreviated elytra, exposing the end of the abdomen. Sap beetles are most abundant in late fall on tree stumps cut in spring or on over-ripe and decaying fruits.

BRACHYPTERUS Er.

- B. urticæ** Fab. Hopatcong (Pm); Hoboken (Coll); g. d. (W); commonly occurs on nettle (Ch).

CERCUS Latr.

- C. abdominalis** Er. Throughout the State IV-VIII, on flowers of pussy willows, elder, etc.

CARPOPHILUS Steph.

- C. hemipterus** Linn. Jersey City, Newark, New Brunswick, Westville; an introduced species, common in grocers' and bakers' stocks.

- C. niger** Say. Throughout the State under bark, in blossoms or on sap, spring and fall.

- C. corticinus** Er. Orange Mts. (Bf); Palisades (Sm); Camden (Li); Grenloch V, 3 DaCosta VI, 10 (W).

- C. marginatus** Er. Hemlock Falls (Bf).

- C. brachypterus** Say. Hudson Co. (div); Orange Mts. (Bf); Newtonville VII, Seaville IV (Sf); Grenloch V, 3, on pine sap (W).

- C. antiquus** Mels. Hudson Co. (div); Clementon VIII, 10, on the black fungus on outside of ears of corn (W).

"*C. dimidiatus*" and "*C. pallipennis*" of the previous edition are misidentifications.

COLASTUS Er.

- C. morio** Er. Bloomfield (Bf); Iona IV, 30 (W); under pine bark.

- C. maculatus** Er. Ft. Lee (Sf); Hudson Co. (Li); also under bark.

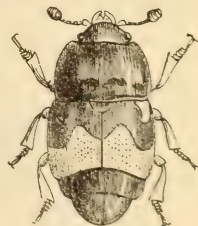


Fig. 104.—*Carophilus hemipterus*; enlarged.

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- C. semitectus* Say. Throughout the State under bark of pine stumps and other trees on flowing sap, often in large numbers.
- C. unicolor* Say. Newark (Bf); Petersburg VI (Brn); Westville, Iona V, 7, in great numbers in stumps of pine (W).
- C. truncatus* Rand. Orange Mts., Newark (Bf); Westville (W); Merchantville V, 17 (Brn).
- var. *obliquus* Lec. Iona V, 7, on pine stumps (W).

CONOTELUS Er.

- C. obscurus* Er. Throughout the State VIII, IX, in "Convolvulus" and other flowers; very like a rove-beetle in appearance.

EPURÆA Er.

- E. helvola* Er. Hudson Co. (Ll); Brigantine IX (Hn); Anglesea VII (Sz); g. d. (W).
- E. rufa* Say. Throughout the State, locally common; sifting in winter, on fungi in fall and spring.
- E. erichsonii* Reitt. Lahaway VI, 12 (Sm); Sea Isle VI, 10 (Brn); g. d. in decaying bloom (W).
- E. corticina* Er. Orange Mts., rare (Bf).
- E. avara* Rand. Hudson Co. (Ll); Lahaway V (Sm).
- E. planulata* Er. Grenloch V, 3, Iona IV, 30, on pine stumps (W).
- E. truncatella* Mann. Newtonville III, 26, 1 specimen (Brn).
- E. ovata* Horn. Arlington VI, in dead fungus (Sf); Newark (Bf).
- E. péltoides* Horn. Hudson Co. (Ll); Orange Mts. V, 5 (Bf); on sap.
- E. labilis* Er. Hudson Co. (Ll); Orange Mts. (Bf).

HAPTONCUS Murr.

- H. luteolus* Er. Hopatcong (Pm).

NITIDULA Fab.

- N. bipunctata* Linn. (*bipustulata*) Ft. Lee (Sf); West Bergen IV, 24, common in dead fishes (Bf); Camden V, 14, Merchantville IX, 30 (Brn).
- N. rufipes* Linn. Throughout the State from fall to spring, under dry animal matter; sometimes common.
- N. zic-zac* Say. Common throughout the State.

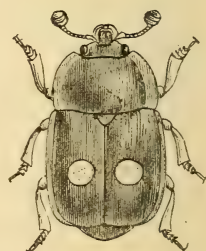


Fig. 105.—*Nitidula bipunctata*; enlarged.

STELIDOTA Er.

- S. geminata* Say. Throughout the State, on sap and under dry leaves.
- S. 8-maculata* Say. Hudson Co. (Ll); Newark, g. d. (Bf); Spring Lake (Ch); Westville (W); Anglesea VII (Sz).
- S. strigosa* Gyll. Malaga, under pine bark (W); Brigantine IX (Hn).

PROMETOPIA Er.

P. 6-maculata Say. Throughout the State under pine and other bark in spring and until VII, 30.

PHENOLIA Er.

P. grossa Fab. Throughout the State, more or less common in gilled fungi.

OMOSITA Er.

O. colon Linn. Throughout the State on dry carrion or in fungi.
The "*O. discoidea*" of previous edition is an error.

SORONIA Er.

S. guttulata Lec. Hudson Co. (Ll); Iona V, 7, on pine roots in scolytid galleries (W).

S. undulata Say. Throughout the State, g. d., not rare.

S. ulkei Lec. Newark (Bf); Jamesburg VII, 4 (Brn); Westville V, 4 (GG); seashore (Li); single specimens only.

S. grisea Linn. Clementon, Malaga VI (W); an introduced species.

POCADIUS Er.

P. helvolus Er. Ft. Lee in *Lycoperdium* (Bt); Camden VII, 25 (GG); Collingswood VII, 23 (Brn); Lacy V, 27 (Dke); g. d. (W).

P. infuscatus Reitt. "New Jersey" (Horn Coll).

MELIGETHES Steph.

M. mutatus Harr. Paterson V, 3 (Jl).

OXYCNEMUS Er.

O. histrinus Lec. Ft. Lee (Bt); Hudson Co. (Ll); seashore (Li); g. d. (W); always rare and "peculiar to the genus '*Phallus*'" (Sz).

O. nigripennis Lec. Brookville IX, 20 (Lg); Sea Isle City IX, 8 (W).

AMPHICROSSUS Er.

A. ciliatus Oliv. Hudson Co. (Ll); West Bergen, Orange Mts., on sap (Bf); Woodbury V, 22, VII, 30 (div); g. d. (W).

PALLODES Er.

P. pallidus Beauv. Throughout the State V-VII, in gilled and other fungi.

CYLLODES Er.

C. biplagiatus Lec. Ft. Lee (Sf).

CYCHRAMUS Kug.

- C. adustus** Er. Hoboken (Sm); Orange Mts. in fungus (Bf); Westville (W); Atco IX, 4 (Brn); in puff-balls, never common.

CYBOCEPHALUS Er.

- C. nigrutilus** Lec. Snake Hill (Sf).

CRYPTARCHA Schuck.

- C. ampla** Er. Throughout the State; a general sap feeder V-VII.
C. strigata Fabr. Ft. Lee (Sf); Hudson Co. (Ll); Orange (Ch); g. d., on sap at all times (W); usually not common.
C. concinna Mels. Ft. Lee (Sf); Hudson Co. (Ll); g. d., not rare (Bf); Lahaway II, 8 (Sm).

IPS Fabr.

- I. obtusus** Say. Throughout the State; rare; on sap.
I. quadriguttatus Fabr. (*fasciatus*) Throughout the State; common under bark, on sap and sometimes in fruits.
I. sanguinolentus Oliv. Throughout the State, though somewhat local and rarely common.

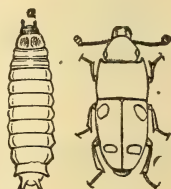


Fig. 106.—*Ips quadriguttatus* and larva; enlarged.

RHIZOPHAGUS Hbst.

- A. scalpturatus** Mann. Orange Mts., salt meadows (Bf).
R. cylindricus Lec. Lahaway III, VI, VII (div); Grenloch XI, 26 (W); g. d., not rare (Li).
R. cylindricus Lec. Lahaway III, VI, VII (div); Grenloch XI, 26 (W); g. d., not rare (Li).
R. brunneus Horn. Grenloch XI, 26, Iona IV, 30, live deep underground around roots of pine (W).
R. bipunctatus Say. Hudson Co. (Ll); Woodside, once plentiful (Bf).
R. minutus Mann. Orange Mts., rare (Bf).

Family LATRIDIIDÆ.

Very small, oval, convex insects with the thorax usually narrower than the elytra. They are very commonly brown in color, often striated, occasionally banded, and found commonly under bark, under decayed leaves and in sweeping among vegetation in early evening. The larvæ are oval, soft, very hairy, and live in vegetable refuse, fungi, etc. Occasionally they are found in granaries, but never in really troublesome numbers.

The arrangement here follows the revision of Prof. H. C. Fall in the

Trans. Am. Ent. Soc. for 1899 in all essentials, and all the species collected and recorded by Mr. Börner were determined by Prof. Fall.

LATRIDIUS Hbst.

- L. breviclavus* Fall. L. I. to Michigan, and almost certainly New Jersey.
L. liratus Lec. (*Stephostethus*) Snake Hill, Ft. Lee (Sf); Newark V, New Brunswick (Coll); g. d., local, not rare (W).

ENICMUS Thom.

- E. minutus* Linn. Arlington VI, sweeping at dusk (Brn).
E. aterrimus Mots. (*Latridius opaculus*). Fort Lee (Sf); Arlington meadows (Bf).

CARTODERE Thom.

- C. ruficollis* Marsh. Mass. to Va., and certain to occur in New Jersey.

CORTICARIA Marsh.

- C. fulva* Com. A cosmopolitan species found from the Atlantic to the Pacific, and from Mass. to Va.; certain to occur in New Jersey.
C. serrata Payk. Also cosmopolitan, as with the preceding.
C. dentigera Lec. Spring Lake (Ch).
C. elongata Gyll. Orange (Ch); Malaga VII (GG); Newtonville III (Brn).
C. ferruginea Marsh. (*deleta*) Orange (Ch) and g. d. in dried products. This is also probably the "*ferruginosa*" Mots. of the last edition, and occurs throughout the State.

MELANOPHTHALMA Mots.

- M. picta* Lec. (*Corticaria*) Snake Hill (Sf); Westville V, 28, Merchantville III, 30, Anglesea VII, 12 (Brn).
M. simplex Lec. (*Corticaria*) Anglesea V, VII (div).
M. villosa Zimm. Newark VII, Gloucester V, DaCosta VII, Sea Isle VI, Anglesea VII (Brn).
M. distinguenda Com. Newark VII, Gloucester to Anglesea, g. d., IV-VII (Brn).
M. pumila Lec. Ft. Lee, Staten Island (Jl).
M. gibbosa Hbst. Newtonville VII, 9 (Brn).
M. similata Gyll. Merchantville VII, Westville V, Gloucester V, DaCosta VII, Anglesea VI (Brn).
M. regularis Lec. "New Jersey"—type locality.
M. longipennis Lec. (*Corticaria*) Arlington III, 19 (Bf); Newark, New Brunswick (Coll).
M. americana Mann. (*Corticaria*) Hudson Co. (Ll).
M. cavicollis Mann. Hudson Co. (Ll); Sea Isle City VIII (Brn).

Family TROGOSITIDÆ.

Usually oblong, flat species, the prothorax as wide as the thorax and often well separated from it. Generally they live under bark, but a few live in granaries, where they sometimes become rather numerous, and more rarely specimens are found on fungus. Some of them are predatory or semi-parasitic in the larval stage, and very few are at all injurious.

THYMALUS Duft.

- T. fulgidus* Er. Throughout the State V, VI. Looks like a bronze ladybird beetle and is usually found on a white birch fungus. Mr. Daecke has actually bred it from "Polyphorus betula-alba."

NEMOSOMA Latr.

- N. parallelum* Mels. Hudson Co. (Ll); Newark (GG); Orange Mts. VII (Bf); Anglesea (Li); feeds on Scolytids.

ALLINDRIA Er.

- A. cylindrica* Serv. Ft. Lee IV, 27 (Jl); Anglesea (W).

TROGOSITA Oliv.

- T. virescens* Fabr. Throughout the State, under bark IV-VIII, locally not rare.

TENEBRIOIDES Pall.

- T. mauretanicus* Linn. Throughout the State and throughout most of the world as well, in granaries, warehouses and stores; known as the "Cadelle."

- T. corticalis* Mels. Occurs with the preceding and sometimes replaces it; but is more general under bark, throughout the State.

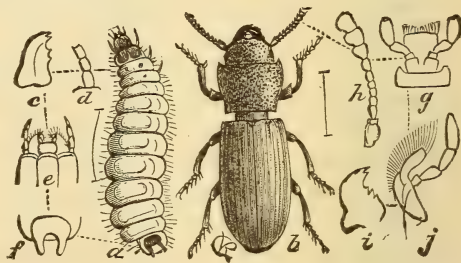


Fig. 107.—The "Cadelle": a, larva; b, adult; c to j, structural details; all enlarged.

- T. collaris* Sturm. Staten Island (Lg); Clementon V (Brn); Lakehurst VII, IX (Jl); Brown's Mills VI (Dke); Anglesea (W).
- T. marginata* Beauv. Anglesea (W).
- T. americana* Kirby. (*castanea* Mels.) Boonton VI (GG); Hudson Co. (Ll); Camden (Li); Anglesea and g. d. (W).
var. *laticollis* Horn. Anglesea (W).
- T. bimaculata* Mels. Ft. Lee VI, VII (div); Hudson Co. (Ll); Orange (Ch); Jamesburg VI (Jl); Malaga VII (GG); Anglesea (W).

Family MONOTOMIDÆ.

MONOTOMA Hbst.

- M. producta** Lec. Brigantine Beach IX, Sea Isle City, Avalon VII, Anglesea VII (div); a strictly maritime species.
- M. picipes** Hbst. Hudson Co. (Ll); under decaying vegetation.

EUROPS Wall.

- E. pallipennis** Lec. Hopatcong (Pm); Ft. Lee, on gummy excretions of hickory (Sf).

BACTRIDIMUM Lec.

- B. ephippigerum** Guer. Ft. Lee (Sf); Hudson Co. (Ll); Orange Mts. (Bf); Merchantville V, 7 (Brn).
- B. striolatum** Reit. Ft. Lee (Sf); Hudson Co. (Ll); Orange Mts. (Bf).
- B. cavicolle** Horn. Hopatcong (Pm); Ft. Lee (Sf); Orange Mts. (Bf), Hudson Co. (Ll), in galleries of and feeding on Scolytid larvæ.

Family DERODONTIDÆ.

Oblong, rather convex species, the thorax rounded and toothed at the edge, elytra yellowish with obscure blackish markings. Very little is known of the adults and less of the larvæ.

DERODONTUS Lec.

- D. maculatus** Mels. Orange Mts. (Bf); Staten Island (Lg).

Family BYRRHIDÆ.

These are usually known as "pill beetles," small in size and generally black with silky iridescent pubescence, which makes the species easily recognizable. The legs and antennæ may be so closely folded to the body as to be practically invisible. They live at the roots of grasses or in water, and are of no economic importance.

CYTILUS Er.

- C. sericeus** Forst. (*trivittatus* Mels.) Greenwood Lake V (Lv); Madison V (Pr); Ft. Lee (Bt); Hudson Co. (Ll); Newark district (Bf); Sea Isle City V (Brn); and probably throughout the State.

BYRRHUS Linn.

- B. americanus** Lec. Newfoundland IX (Jl); Paterson V (Soc); Greenwood Lake, Ft. Lee (Bt); Newark (Bf); along the shore, Brigantine to Cape May VI, VII (div); not common.

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LIMNICHUS Latr.

- L. punctatus** Lec. Newark, rare (Bf); Burlington County (Sm).
L. ovatus Lec. Lahaway V, 28, on cranberry bogs (Sm); Anglesea II, 22 (W).

FORCINOLUS Muls. & Rey.

- F. minimus** Fabr. Lakehurst (Brb, Jl).

Family NOSODENDRIDÆ.

Very similar to the "Byrrhidæ; more bronzed, less silky and feeders on the sap of trees.

NOSODENDRON Latr.

- N. unicolor** Say. Ft. Lee (div); Snake Hill, Orange Mts., g. d., rare (Bf); Atlantic City (W).

Family PARNIDÆ.

These are aquatic beetles, with long legs not fitted for swimming. They are usually gray or black, sometimes striped with yellow, and may be found clinging to the under side of stones or wood debris in streams and ponds. They are oblong or elongate, convex, and the division between thorax and abdomen is unusually well marked. The larvæ are aquatic, flattened, and resemble crustaceans in appearance.

PSEPHENUS Hald.

- P. lecontei** Lec. Hemlock Falls, not rare (Bf); Newark (Coll); Millburn, on stones in streams (Bt); Echo Lake, on stones and lily pads (Ds); Lake Macopin, abundant, walking on large submerged stones (Lg); Spotswood (Rob).

DRYOPS Oliv.

- D. lithophilus** Germ. Throughout the State, not rare, V-VIII.
D. fastigiatus Say. Hopatcong (Pm); Orange Mt. and Newark district (div); Jamesburg, Lakehurst (Rob).
D. striatus Lec. Orange Mts. (Bf); Jamesburg, Lakehurst (Rob).

ELMIS Latr.

- E. bivittatus** Lec. Jamesburg (Rob); "New Jersey" (Lg).
E. 4-notatus Say. Ft. Lee (Sf); Clifton (Ll); Jamesburg, Spotswood, Lakehurst (Rob); Atco (W).
E. elegans Lec. Newark (Bf); Westfield Conn. (Sf).

- E. fastiditus* Lec. Jamesburg (Rob).
E. ovalis Lec. Lakehurst (Rob).
E. nitidulus Lec. Ft. Lee (Sf); Jamesburg VII, 4 (div); Spotswood (Rob); Atco (W).
E. pusilius Lec. Ft. Lee Dist. (Rob); Clifton (Ll).

STENELMIS Dup.

- S. sinuatus* Lec. Lakehurst (Rob).
S. crenatus Say. Hopatcong (Pm); Clifton (Ll); Newark, at light (Bf); Spotswood, Lakehurst (Rob); Clementon VIII, 5 (Brn).
S. bicarinatus Lec. Newark, at light (Bf); Jamesburg, Spotswood (Rob).
S. 4-maculatus Horn. Newark (Bf); Jamesburg (Rob).
S. vittipennis Zimm. Clifton (Ll).

MACRONYCHUS Müll.

- M. glabratus* Say. Hopatcong (Pm); Clifton (Ll); Orange Mts. (div); New Brunswick VIII, 29 (Coll); Jamesburg VII, 4 (div); Woodbury (Brn); under logs in running water.

ANCYRONYX Er.

- A. variegatus* Germ. Orange Mts. (div); Clifton (Ll); Jamesburg VII, 4 (Bf); Spotswood (Rob); Atco VI, 18, Clementon VIII, 5, Newtonville VII, 9 (Brn); g. d. (W).

Family HETERO CERIDÆ.

These beetles are oblong, convex, densely clothed with short silken pubescence. The thorax is almost square, the angles rounded, head small, with the mandibles projecting prominently. They are yellowish in color, mottled with black spots or bands, and live in galleries in sand or mud along the banks of ponds, streams or ditches. They fly at night and are often attracted to light in large numbers.

HETERO CERUS Fabr.

- H. tristis* Mann. Seashore, rare (Ll).
H. undatus Mels. (*fatuus* Kies.) Orange Mts., Newark (Bf); Woodbury VII (GG); Brigantine Beach IX (Hn); Anglesea V (W).
H. ventralis Mels. Atlantic City (W).
H. auromicans Kies. Anglesea V, 30 (W).
H. pusillus Say. Orange Mts., Newark (Bf); Orange, abundant at light (Ch); Sea Isle V, Anglesea VI (Brn).

The record of "*brunneus*" Mels. is an error of identification.

Family DASYLLIDÆ.

Small, oval, convex species with rather soft elytra, head concealed and bent down, antennæ usually slender, but often serrated toward the tip. The legs are slender, and when disturbed the insects usually draw up so as to seem almost hunched, the broadest part of the body coming a little before the middle. They are beaten from trees or swept from shrubs, and some species are very common, though none are known to be injurious.

EURYPOGON Mots.

- E. niger* Mels. Hopatcong (Pm); Greenwood Lake (Sf); Orange Mts. VI, 2 (Bf); Hudson Co. (Ll); Chew's Landing VI, 9 (W); DaCosta VI, 4 (Dke). •

ODONTONYX Guer.

- O. trivittis* Germ. Orange Mts. (Bf); Montclair (Sm); very rare.

PTILODACTYLA Latr.

- P. serricollis* Say. Hudson Co. (Ll); Orange Mts., Newark (Bf); Woodbury VII, Sea Isle VI, Anglesea VI (Brn); g. d. (W).

EUCINETUS Germ.

- E. terminalis* Lec. Hudson Co. (Ll); Newark (Bf); Merchantville X (GG); Chew's Landing, Anglesea VI, 9 (W); among decaying leaves.
E. strigosus Lec. Merchantville X, Woodbury XII, Gloucester XI, Clementon IX (W).

ECTOPRIA Lec.

- E. nervosa* Mels. Hopatcong (Pm); Boonton VI (GG); Hudson Co. (Ll); Orange Mts., Woodside VI (Bf); Anglesea (W). The record of "*Placonycha edwardsii*" Lec. was based on a specimen of this species.

DICRANOPSELAPHUS Guer.

- D. variegatus* Horn. "N. Y. City and vicinity," in the Jülich Coll. (Lg).

PRIONOCYPHON Redt.

- P. limbatus* Lec. East Jersey (Dietz); Staten Island (Lg); DaCosta (W).

HELODES Latr.

- H. pulchella* Guer. Hopatcong (Pm); Orange Mts., Woodside (Bf); Haddonfield V, 13 (GG); Lahaway V, 28 (Sm); DaCosta VII, Chew's Landing VI (W).
H. thoracica Guer. Hopatcong (Pm); Orange Mts., Woodside (Bf).

SCIRTES III.

- S. orbiculatus* Fab. Hudson Co. (Li); Clementon V, VIII (div).
S. tibialis Guer. Throughout the State VI, VII; not rare.

CYPHON Payk.

- C. robustus* Lec. Merchantville V, 23, Anglesea, in swamps among Sphagnum (W); Atco V (div); Buena Vista (Li); Sea Isle V (Brn).
C. ruficollis Say. Orange Mts., Clementon VI, 3 (GG); Westville VI, 6 (Brn); Anglesea (W).
C. obscurus Guer. Newark (div); Waverly III (Bf); Jamesburg VII, Camden, Westville IV, 22, DaCosta VI, Anglesea V (Brn).
C. collaris Guer. Hudson Co. (Li); g. d. (Bf).
C. variabilis Thunb. Common throughout the State.
C. padi Linn. Anglesea (W).

Family RHIPICERIDÆ.

Elongate, very convex black or brown species, somewhat resembling "Elateridæ"; but without the power of leaping; thorax shorter, head more prominent, with large calliper-like mandibles and flabellate antennæ in the males. They are very rare and usually found on or near dead trees.

SANDALUS Knoch.

- S. petrophya* Knoch. North Jersey (Li); Plainfield, Lakehurst IX (Sf); Newark (Bf); Staten Island on beech (Lg); Anglesea in wash-up (W).

Family EUCNEMIDÆ.

Resemble in general the following "Elateridæ" and sometimes united with them; but the prothorax is more closely joined to the mesothorax, and the "snapping" habit is not developed. None of the species are injurious, and several of them are distinctly rare.

MELASIS Oliv.

- M. pectinicornis* Mels. Palisades (Lv); Alpine (Bt); Ft. Lee (Sf); Newark (Soc); Orange Mts. (Bf); Clementon V, 2 (CG); Atlantic City (Castle); Avalon VI (Brn); Anglesea VII and South Jersey (W); bores in dead oaks and is always rare.

THAROOPS Lap.

- T. ruficornis* Say. Throughout the State VI, VII; local and always rare; bores in felled trees.

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DELTOMETOPUS Bonv.

- D. amoenicornis* Say. Hudson Co. (Li); Ft. Lee (Sf); Hemlock Falls, Chester (Bf); Iona VI, Avalon VI (Brn); Anglesea V, VI (div); and probably throughout the State, though never common.
- D. rufipes* Mels. Fort Lee (Sf).

DROMÆOLUS Kies.

- D. cylindricollis* Say. Hemlock Falls (Bf); Ft. Lee, on bull thistle, at the junction of leaf and stem; hard to pick off (Bt); breeds in dead or dying branches (Sz).
- D. striatus* Lec. Jamesburg VII, 4, Petersburg VI, 8, DaCosta VII, 16 (Brn); Buena Vista (Li).

FORNAX Lap.

- F. calceatus* Say. Orange Mts., rare (Bf).
- F. orchesides* Newm. Ft. Lee, larvæ by the thousands in dead gum tree (Jl); Avalon (W).

ENTOMOPHTHALMUS Bonv.

- E. rufiolus* Lec. Ft. Lee (Sf); Orange Mts. (Bf); Hemlock Falls (Stortz); Petersburg VI, 18, under bark (Brn).

MICRORRHAGUS Esch.

- M. subsinuatus* Lec. Ft. Lee (Sf); Orange Mts., rare (Bf).
- M. triangularis* Say. Hopatcong (Pm); Madison (Pr); Ft. Lee (Bt); Orange Mts., Newark (Bf); on dead branches like all of this genus.
- M. pectinatus* Lec. Orange Mts., Hemlock Falls, rare (Bf).
- M. bonvouloirii* Horn. Fort Lee (Sf).

The "humeralis" and "imperfectus" of the previous edition are based on errors of determination.

HYPOCÆLUS Esch.

- H. frontosus* Say. Fort Lee VII, 10 (Jl).
- H. terminalis* Lec. Orange Mts., Hemlock Falls (Bf).

SCHIZOPHILUS Bonv.

- S. subrutus* Rand. Plainfield (Sf); South Jersey (Li).

SARPEDON Bonv.

- S. scabrosus* Bonv. Palisades, bred (Lv); Boonton VIII, 3 (GG); Orange Mts. (Bf).

PEROTHOPS Er.

- P. mucida* Gyll. Camden (Li); Anglesea (W); rare; breeds in dead beech.

CEROPHYTUM Latr.

C. pulsator Hald. Fort Lee, 1 specimen (Sf).

Family ELATERIDÆ.

The species belonging to this family are commonly known as "click," "snapping" or "spring beetles," because of their power of springing into the air when laid on their back and turning right-side-up in the process. The prothorax is long, loosely jointed to the meso-thorax, prolonged backward on the under side into a curved process, which fits into a groove or cavity in the meso-thorax. When placed on its back the beetle elevates the body until it rests on the head and tip of elytra, and the end of the

spine rests at the edge of the cavity.

The tension is then suddenly removed and the curvature reversed, the shoulders of the wing-covers striking the surface hard enough to elevate the beetle for quite a distance. In general the insects are at least three times as long as wide, broadest at the shoulders and tapering posteriorly. The prevailing colors are brown, black or yellowish, and few of our species are spotted or banded. As adults they rarely do much feeding and are not injurious. The larvæ are long, slender, a little flattened, yellowish or whitish, and very tough or leathery in texture, whence they are termed "wire-worms." Some of these live in decaying wood and are practically harmless, but others live in the soil, feeding on the roots of growing plants, chiefly grasses.

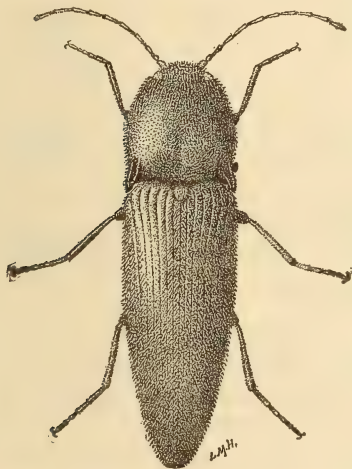


Fig. 108.—A click-beetle, or snapping beetle; enlarged.

Corn, potatoes and other crops following sod are chiefly injured, and when the pests are very abundant little can be done to stop them. Ordinary insecticide applications are entirely useless, because it is practically impossible to reach the insects where they are feeding. Systematic fall plowing of sod land is useful, because it destroys the pupæ and recently developed beetles, and this, combined with short periods in sod, serves to lessen the evil. Chickens eat the insects when turned up by the plow, and hogs take them greedily when they can get at them. In the garden they can be attracted to cut pieces of potato, which may be gathered and destroyed when filled with the insects. They have also been baited with little masses of poisoned sweet dough placed underground, but that is only attractive while fresh.

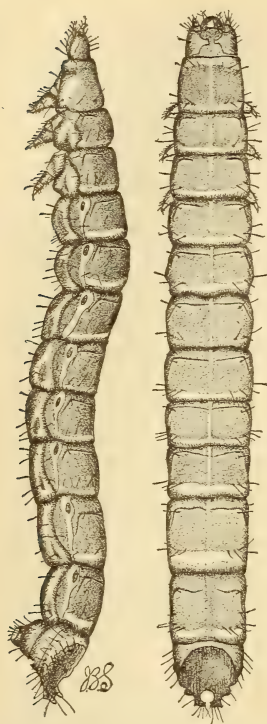


Fig. 109.—Wire worm from above and side; enlarged.

AGRYPNUS Esch.

- A. sallei* Lec. Manumuskin V, 12 (Dke); Anglesea VI, VII, IX (div).

ADELOCERA Latr.

- A. impressicollis* Say. Lakehurst VII (Ds).
A. marmorata Fab. Gloucester and Camden Co. (W); Westville (Li); Manumuskin V, 5 (Dke).
A. discoidea Web. Throughout the State IV–VI, local, not common.
A. aurorata Lec. Chester (Dn); Livingston Park V, 8 (Gr).
A. maculata Lec. New Jersey, exact locality unknown (Li).
A. obtecta Say. Ft. Lee VI (Jl); So. Amboy X (Bt).
A. brevicornis Lec. Palisades (Jl); all the species under dead bark.

CHALCOLEPIDIUS Esch.

- C. viridipilis* Say. Camden and Gloucester Counties, rare (div).

ALAUS Esch.

- A. oculus* Linn. Throughout the State, not rare; our largest and most conspicuous species; larva in decaying wood.
A. myops Fab. Throughout the State where pine occurs; always rare; larva under pine bark IV–VI, adults VI–VIII.

HEMIRHIPUS Latr.

- H. fascicularis* Fab. G. d., but local and very rare (W).

CARDIOPHORUS Esch.

- C. convexus* Say. Throughout the State V–VII.
C. cardisce Say. Hopatcong (Pm); Woodside (Bf); Highlands (Ch); Anglesea V (div); g. d. (W), and probably throughout the State.
C. fenestratus Lec. Anglesea V, 30, 1 specimen (W).
C. convexus Lec. Greenville, in early spring, under stones (Bf).
C. gagates Er. (*laevicollis* Er.) Throughout the State IV–VI, locally not rare.
C. robustus Lec. Greenville, rare (Bf); Anglesea V, 28 (Sm).

HORISTONOTUS Cand.

- H. curiatus** Say. Ft. Lee (Bt); Hudson Co. (Ll); Orange Mts. (Bf); Jamesburg VII, 4 (Sm); Camden, Gloucester Co. (div) National Park VI, 10 (Dke).

CRYPTOHYPNUS Esch.

- C. abbreviatus** Say. Snake Hill IV (Sf); Newark Dist., salt meadow (Bf); Orange (Lg).

HYPNOIDUS Schioerite.

- H. exiguus** Rand. Jamesburg V, 10 (Sm); Camden, Westville V (div); Sea Isle V, 10 (Brn).
H. choris Say. Chester (Dn); So. Camden IV, V (div); Gloucester Co. (Li); Merchantville IV, 24, Westville V, 28 (Brn).
H. obliquatulus Mels. Irvington, Orange Mts., salt meadow (Bf); Staten Island (Jl); Camden (Li); Woodbury V, 22 (GG); Ocean Co. V, 28 (Sm); Peermont VI, 28 (Brn).
H. perplexus Horn. New Jersey (Lg).
H. pectoralis Say. Salt meadows, Springfield, Orange Mts., rare (Bf).
H. delumbis Horn. Staten Island (Lg).
H. melsheimeri Horn. Springfield, washed out with "Bembidium" (Bf).

MONOCREPIDIUS Esch.

- M. lividus** DeG. Throughout the State VI, VII, not rare.
M. vespertinus Fab. Throughout the State VII-IX, locally common; more abundant along shore; injurious to beans at DaCosta VII.
M. auritus Hbst. Common throughout the State VI, VII.
M. bellus Say. Throughout the State, not rare VI, VII, sweeping; breeds at the roots of millet—"Panicum" sp. (Ch).

ELATER Linn.

- E. hepaticus** Mels. Newark Dist. (Bf); Camden, Gloucester Co. (W).
E. manipularis Cand. Newtonville III, 24, IV, 16 (Brn).
E. carbonicolor Esch. Clementon V, 30 (GG).
E. pedalis Germ. Throughout the State VI, locally common on flowers, especially on magnolias in South Jersey.
E. nigrinus Payk. Staten Island V, on flowers (Ds).
E. mixtus Hbst. Throughout the State IV-VI, on flowers; rare.
E. nigricollis Hbst. Throughout the State II-V, under bark and on flowers; locally not rare.
E. linteus Say. Hudson Co. (Ll); Riverton IV, 10 (GG); Gloucester IV, 20, Seaville IV, 29 (Brn); g. d. (Li, W).

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- E. discoideus** Fab. Palisades, bred from beech (Lv); Ft. Lee (Bt); Staten Island under hickory bark II, Lakehurst IV (Ds); Riverton V, 28 (GG).
- E. sayi** Lec. Hopatcong (Pm); Ft. Lee under oak bark (Bt); Staten Island V (Ds); Camden, Gloucester Co. (W); always rare.
- E. socer** Lec. Lahaway VI, 16 (Sm).
- E. rubricollis** Hbst. Throughout the State IV-VI under bark and on flowers.
- E. semicinctus** Rand. Newfoundland VII (Ds); Hemlock Falls in early spring, rare (Bf); New Jersey (Jül).
- E. militaris** Harr. Hemlock Falls (Bf); Anglesea (W); rare.
- E. luctuosus** Lec. Ft. Lee (Bt); Staten Island (Lg).
- E. nigricans** Germ. Ft. Lee (Bt); Hudson Co. (Ll); Staten Island V (Ds); on flowers.
- E. rubricus** Say. Throughout the State V, VI, on flowers; common on magnolias in the swamps of South Jersey.
- E. collaris** Say. Hopatcong (Pm); Ft. Lee V (Bt); Staten Island V (div); Lakehurst V (Ds); Camden (Li); on flowers and not common.
- E. sanguinipennis** Say. Throughout the State IV, V, VIII, IX, locally common.
- E. xanthomus** Germ. Newark Dist. (Bf); Riverton IV, Malaga VI (GG); Camden, Gloucester Co. (W); Clementon III, Petersburg VI (Brn); Lahaway III (Coll).
- E. obliquus** Say. Ft. Lee (Bt); Hudson Co. (Ll); Newark (Soc); Orange Mts. (Bf); Ocean Co. (Coll); g. d. (W Li); not common.
- E. pusio** Germ. Hudson Co. (Ll); Orange Mts. (Bf); Anglesea VII, 4 (Lv).

DRASTERIUS Esch.

- D. elegans** Fab. Throughout the State IV-VII; usually common.
- D. amabilis** Lec. Throughout the State IV-VII; hardly less common.

MEGAPENTHES Kies.

- M. limbalis** Hbst. Throughout the State in July; not common.
- M. rufilabris** Germ. With the preceding, but even more rare.

LUDIUS Latr.

- L. attenuatus** Say. Chester (Dn); Ft. Lee (Bt); Hudson Co. (Ll); Caldwell (Cr); Newark (Soc); Camden (Li); Lahaway VII, 12 (Sm); Manumuskin VI, 21, bred from decaying red cedar (Dke); not common.
- L. abruptus** Say. Hopatcong (Pm); Hudson Co. (Ll); Caldwell (Cr); Orange Mts. (Bf); Westville (Li); Woodbury VII (Brn); Weymouth VII, 20 (Dke).

ORTHOSTETHUS Lac.

O. infuscatus Germ. Avalon, rare (W).

AGRIOTES Esch.

A. mancus Say. Weehawken (Bt); Caldwell (Cr); Orange Mts., Newark Dist. (Bf); Hudson Co. (Ll); Staten Island III (Ds); not rare.

A. stabilis Lec. Madison (Pr).

A. insanus Cand. Hudson Co. (Ll); Staten Island V, VI (Ds).

A. fucus Lec. Fort Lee (Bt).

A. pubescens Mels. Camden, Gloucester Co. (W); g. d. (Li).

A. limosus Lec. Palisades (Jl).

A. oblongicollis Mels. Throughout the State IV, V; locally common.

DOLOPIUS Esch.

D. lateralis Esch. Throughout the State IV-VI; locally common.

BETARMON Kies.

B. bigeminatus Rand. Ft. Lee (Bt); Hudson Co. (Ll); Orange Mts. (Bf).

GLYPHONYX Cand.

G. recticollis Say. Throughout the State V, VI; locally common.

G. testaceus Mels. With the preceding and equally common.

MELANOTUS Esch.

It is among the species of this genus that we find our most common forms; their larvæ are nearly all root-feeders, and the common wire-worms infesting cultivated crops.

M. decumanus Er. Ft. Lee (Bt); Hudson Co. (Ll); Orange VI (Ch); Ocean City VII, 12 (Vk); g. d. (W); not common.

M. secretus Lec. Hopatcong (Pm); Woodbury V, 22 (GG); Atco (Li); Anglesea and South Jersey (W).

M. ignobilis Mels. New Jersey (Coll. Horn).

M. depressus Mels. Generally distributed; not rare (W).

M. angustatus Er. With the preceding (W).

M. trapezoideus Lec. G. d., rare (W).

M. tænicollis Lec. Ft. Lee (Sf); Newark Dist., on willow, not rare (Bf); Staten Island VI (Ds); Westville, rare (W).

M. leonardi Lec. Greenwood Lake V (Lv); Ft. Lee VII (Jl); So. Amboy under pine bark (Bt); Malaga VI (GG).

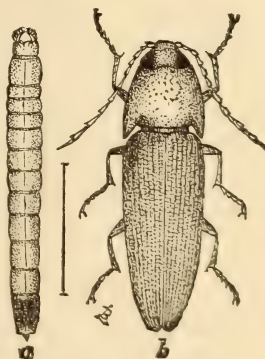


Fig. 110.—*Melanotus* species and its larva; enlarged.

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- M. castanipes* Payk. (*scrobicollis* Lec.) Newark (Bf).
M. glandicolor Mels. Hudson Co. (Li).
M. fissilis Say. Common throughout the State V-VIII.
M. communis Gyll. With the preceding and equally common.
M. exuberans Lec. New Jersey (Horn Coll).
M. parumpunctatus Mels. Ft. Lee (Bt); Hudson Co. (Li).
M. cribulosus Lec. DaCosta, on pine V, VI (W).
M. pertinax Say. Orange (Lg); Newark (div); New Brunswick VII (Coll); Anglesea (W); rare.
M. dubius Lec. Hopatcong (Pm); South River VII (Coll); g. d., not rare (W).
M. tenax Say. New Jersey (Horn Coll).
M. americanus Hbst. Throughout the State V; locally common.
M. insipiens Say. DaCosta V, on pine (W); g. d. (Li).
M. variolatus Lec. Newark Dist., g. d. (Bf), rare.
The "sagittarius" of the previous edition is a misidentification.

LIMONIUS Esch.

- L. auripilis* Say. Atco (Li); Camden, Gloucester Co. (W); rare.
L. stigma Hbst. New Jersey (Horn Coll).
L. griseus Beauv. Throughout the State V, VI; common.
L. interstitialis Mels. Camden, Anglesea (W).
L. confusus Lec. Hopatcong (Pm); Newark Dist. (Bf); g. d. (Li); rare.
L. plebejus Say. Throughout the State V; locally common.
L. æger Lec. Staten Island V (Ds); Ocean Co., not rare (Sm).
L. quercinus Say. Throughout the State, common V-VII.
L. basillaris Say. East Jersey (Dietz); South River V, 26, VII, 8 (Coll); g. d. (Li, W); Atco VI, 5 (GG).
L. agonus Say. Newark V (Soc); Atlantic City (Castle).
L. definitus Ziegl. Hopatcong (Pm); Newark Dist. (Bf); Atco, rare (Li).
*L. nimbatu*s Say. Hudson Co. (Li); Newark Dist., common (Bf); Westville (Li); g. d. (W).

PITYOBIUS Lec.

- P. anguinus* Lec. South River VII, 8 (Coll); DaCosta (Castle); Atlantic City (div); Sea Isle City VII, 12 (Brn).

ATHOUS Esch.

- A. brightwellii* Kirby. Ft. Lee (Bt); Hudson Co. (Li); Anglesea (W).
A. acanthus Say. Throughout the State V-VII; common.
A. cucullatus Say. Throughout the State V-VII; locally common.
A. scapularis Say. Pasilsades, Ft. Lee VI, 18 (Jl).
A. equestris Lec. New Jersey (Coll Horn).

OESTODES Lec.

- O. tenuicollis* Rand. Labaway (Sm).

PARANOMUS Kies.

- P. estriatus* Lec. Fort Lee VI, 27 (Jl).

SERICOSOMUS Steph.

- S. viridanus* Lec. Orange Mts. (Bf); DaCosta (W); seashore (Li).
S. silaceus Say. Throughout the State V, VI; common.
S. debilis Lec. Landisville, 1 specimen (Li). Mr. Schwarz points out that this is a Californian species. Mr. Liebeck claims that he has compared it carefully with authentic examples and description and can find no difference. He made the capture himself, but admits the possibility of an accidental introduction.

CORYMBITES Latr.

- C. tessellatus* Linn. Throughout the Highlands and northward V, VII, rare; Camden, Gloucester Co. (W); Lakehurst V, 29 (Jl).
C. cylindriciformis Hbst. Ft. Lee (Bt); Hudson Co. (Li); Caldwell (Cr); Newark Dist. (Bf); New Brunswick VI (Coll); g. d. (W, Li).
C. pyrrhos Hbst. Throughout the State, locally common VI, VII.
C. tarsalis Mels. Throughout the State V, VI, on willow (Bf), on pine (W); not recorded from the true pine barrens nor the sea coast.
C. sulcicollis Say. Ft. Lee V, 18 (Jl); New Jersey (W).
C. æthiops Hbst. Piedmont Plain and northward V, VI, and Delaware Valley V; locally not rare.
C. medianus Germ. New Jersey VII, VIII (Bt).
C. hamatus Say. Ramapo Mts. V, 27 (Brn); Ft. Lee V, 29 (Jl); New Jersey (W).
C. hieroglyphicus Say. Greenwood Lake (Sf); Hudson Co. (Li); Caldwell (Cr); Newark Dist., Orange Mts. (Bf); g. d. (Li); locally common.
C. inflatus Say. Ft. Lee (Bt); Hudson Co. (Li); Newark Dist. (Bf); Gloucester (Li); Newtonville VI, 19 (Brn); Manumuskin IV, 28 (Dke); Anglesea V, 28 (Sm).
C. rotundicollis Say. New Jersey (Joutel).

HEMICREPIDIUS Germ. (ASAPHES Kirby.)

- H. decoloratus* Say. Throughout the State V-VII; not rare.
H. memnonius Hbst. With the preceding and more common.
H. bilobatus Say. Ft. Lee (Bt); Hudson Co. (Li); Caldwell (Cr); So. Camden (W).

MELANACTES Lec.

M. piceus DeG. Throughout the State VI, VII; sometimes common.

M. morio Fab. With the preceding, but more rare.

Family **CEBRIONIDÆ**.

Represented by a single species only in our fauna. Resembles the "Elateridæ" in general appearance and united with them in the last edition.

CEBRIO Oliv. .

C. bicolor Fabr. New Jersey V (Bt); Camden and Gloucester Co.; rare (W).

Family **THROSCIDÆ**.

Resembles the "Elateridæ"; but the prothorax is firmly articulated to the mesothorax, and the species have no power of leaping. They are usually found on dead wood or on flowers, and are inconspicuous as well as small. None are of economic importance.

DRAPETES Redt.

D. geminatus Say. Ft. Lee (Bt); Hudson Co. (Li); Westville, Buena Vista (Li); Petersburg VI, Iona VI, Avalon VII (Brn); Iona VI (Dke); under bark and on dead branches (Ch).

AULONOTHROSCUS Horn.

A. constrictor Say. Newark (Bf); Lahaway V, 28 (Sm).

THROSCUS Latr.

T. chevrolati Bonv. Throughout the State V-VII.

T. bonvouloeri Blanch. Snake Hill (Sf).

The "T. convergens" of the last edition is based on a misidentification.

Family **BUPRESTIDÆ**.

These are elongate, usually stout but sometimes cylindrical beetles, with broad thorax and elytra tapering back from the shoulders, the prothorax closely united to the mesothorax. A large proportion of them are bronzed or metallic in color or reflection, and others are gaudily marked with red or yellow bands or spots. Many of them have the upper surface deeply grooved or pitted, and altogether they are very characteristic in appearance. Most of them are very active and fly readily, so that they are not often recognized except by collectors.

The larvæ are wood-borers, living under bark and making broad, rather shallow furrows, galleries or chambers, going into the solid wood only to pupate, except in those cases where the species live in dead, dying or decaying wood. In shape they are very much elongated, somewhat flattened, the body segments well defined, head small, the anterior segments much enlarged, so as, apparently, to form part of the head, giving rise to the common names "hammer head" or "flat-head" borers. A number of these are of economic importance because they infest orchard trees. The larger species usually favor plants that are low in vitality from injury or other causes; hence such trees may be protected by keeping them in healthy growing condition. Others, like those belonging to the genus "*Agrilus*," attack plants and trees in full vigor. As against these our methods of defense must be adapted to the history of the insects.

CHALCOPHORA Sol.

- C. virginiensis* Dru. Recorded from all sections of the State V and VI, breeding in pines; not common at any point.
- C. liberta* Germ. Newark, Orange Mts. (Bf); Westville, Egg Harbor (Li); Lahaway V, 18 (Sm); Atlantic Co. (W); also breeds in pine.

TEXANIA Casey.

- T. campestris* Say. West Hoboken on tulip trees (Ch); breeds also in sycamore, beech, maple, etc.

BUPRESTIS Linn.

- B. lineata* Fab. Newark (Bf); Lakehurst VI, 30 (Jl); Malaga VIII, 4 (GG); DaCosta VII, 28 (Dke); Brigantine Beach in drifted wood (Hn); Sea Isle IV, VI (div); Anglesea VI, 14 (Brn); g. d. IV, V, (W, Li); breeds in pine.
- B. consularis* Gory. Lahaway VII, 5 (Sm); g. d., rare (W); seashore. rare (Li).
- B. rufipes* Fab. Seashore (Li); Anglesea VII, on oak and flying around dead wood, Cape May (W); breeds in oak and beech (Ch).
- B. fasciata* Fab. Gloucester Co., rare (W).
- B. striata* Fab. Ft. Lee in hemlock (Jl); Newark (Soc); Westville (Li); DaCosta V, 30 (W); always rare; bred from pine (Ch).
- B. decora* Fab. Gloucester Co., one specimen (W).
- B. ultramarina* Say. Westville IV, 19, Atlantic City as late as VI, 28 (W); Lakehurst (Ds); DaCosta IV, 28-V, 30 (div); Clementon V, 7 (GG); Sea Isle V, 24 (Brn); breeds in pine.
- B. apicans* Hbst. Boonton I, 31 (GG).

The records for "*nuttalli*" of the previous edition should be referred to "*consularis*."

DICERCA Esch.

- D. obscura* Fab. Throughout the State VI, VII, the larva in hickory.
- D. lurida* Fab. With the preceding, of which it has been considered a variety.
- D. pugionata* Germ. Ft. Lee VII (Sf); Hudson Co. (Li); Newark Dist. (Bf); Gloucester Co. (div); on black alder (W), and also breeds in "Spiræa" (Hn).
- D. divaricata* Say. Throughout the State; breeds in apple, beech, maple and a great variety of other deciduous trees; but has not been injurious thus far in New Jersey. It is likely that a number of the forms recently described by Casey at the expense of this species will also be found in New Jersey. The "*D. prolongata*" of the previous edition belongs here.
- D. punctulata* Sch. Throughout the pine barrens V-VIII and along the seashore; Ft. Lee (Bt); Camden, Gloucester Co. (W); breeds in pine.
- D. americana* Hbst. (*asperata* L. & G.) Snake Hill IV, 30, from oak (Jl); Orange Mts. (GG); Newark Dist., at roots of hickory in spring (Bf); New Jersey (Li); probably breeds in oak (Ch).
- D. scobina* Chev. (*spretta* Gory.) Newark (Soc); Camden, Gloucester Co., Anglesea (W); always rare.
- D. mutica* Lec. Brooklyn, N. Y., and sure to occur in New Jersey.

PÆCILONOTA Esch.

- P. cyanipes* Say. Newark (Soc); seashore, rare (Li).
- P. thureura* Say. Gloucester Co. (Li); Atlantic Co. (W); rare.

CINYRA Lap. & Gory.

- C. gracilipes* Mels. Ft. Lee (Sf); Hudson Co. (Li); Westville (Li); Gloucester Co. (W); breeds in oak (Ch).

MELANOPHILA Esch.

- M. notata* Lap. & Gory. Sea Isle VI, 15 (Brn).
- M. acuminata* DeG. (*longipes* Say.) Newark, Orange Mts. (Bf); DaCosta V (W); g. d. (Li); breeds in conifers.
- M. fulvoguttata* Harr. Orange Mts. on spruce (W) and hemlock (Bf).
- M. æneola* Mels. Jamesburg VII, 4 (Jl); Lakehurst VII (div); DaCosta V (W); Malaga VIII, 4, IX, 15 (GG); Landisville (Li); Atlantic City (Castle); Newtonville VI, Iona VI, Anglesea VII, 12 (Brn); on pine.

ANTHAXIA Esch.

- A. æneogaster* Lap. Orange Mts., rare (Bf).
- A. viridifrons* Lap. Throughout the State; bred from hickory and probably also attacks elm.
- A. viridicornis* Say. Madison VI (Pr); Orange Mts. (Bf); Staten Island (Lg).

A. quercata Fab. (*cyarella* Gory.) Throughout the State V-VII; larva in grape and chestnut (Ch).

A. flavimana Gory. Riverton V, 20 (GG); g. d. (W, Li).

XENORHIPIS Lec.

X. brendeli Lec. Fort Lee, 1 specimen, bred from wood (Jl).

CHRYSOBOTHRIS Esch.

C. femorata Fab. Common throughout the State V-VII, in many local varieties. The larva is the "flat-head apple-borer," which attacks also fruit and many forest trees, sometimes becoming injurious. It favors trees low in vitality, hence keeping trees in good condition is protective. When they actually get into the wood they can be cut out, their location being usually-discernible by a slight discoloration of the bark.

C. floricola Gory. Hudson Co. (Li); Landisville, DaCosta (Li); Cape May C. H. V, 28 and g. d. (W); breeds in pine.

C. dentipes Germ. With the preceding and also breeds in pine.

C. pusilla Lap. & Gory. Newark (Bf); Landisville, DaCosta (Li); Newtonville VI, Iona VI, Sea Isle VI (Brn); Lakehurst V, VII (Jl); Atlantic Co., Cape May C. H., Anglesea V, 28 (W); breeds on pine.

C. sexsignata Say. Ft. Lee VII, 10, Jamesburg VI, 29 (Jl); Hudson Co. (Li); Orange Mts. (Bf); Camden, Gloucester Co. (W); on beech, birch and chestnut.

C. azurea Lec. Throughout the State in June; bred from white birch (Jl), has been taken on sumac (Bf), and once abundant on "Cornus paniculata" (Lg).

C. scitula Gory. Landisville, DaCosta (Li); g. d. (W); rare; said to breed in deciduous trees.

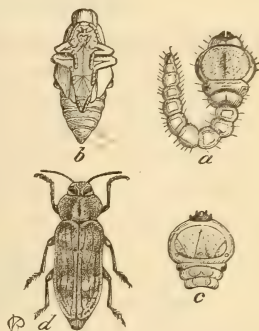


Fig. 111.—*Chrysobothris femorata*: a, larva; b, pupa; c, adult.

ACTENODES Lac.

A. acornis Say. Newark, Orange Mts., rare (Bf); Atlantic Co., on pine (W); common in the wash-up, Brigantine to Cape May V-IX.

ACMÆODERA Esch.

A. ornata Fab. Generally distributed, on flowers (W).

A. pulchella Hbst. Newtonville, DaCosta VII, 9-30 (Brn); Atco (Li); Atlantic Co. (W); resting on wild sun-flower VII, 19 (Dke).

A. culta Web. Throughout the State V, VI, locally not rare.

PTOSIMA Sol.

- P. gibbicollis* Say. Seashore (Li); Anglesea (W), rare; bred from red-bud, "*Cercis canadensis*" (Ch), and also found on black locust (Sz).

MASTOGENIUS Sol.

- M. subcyaneus* Lec. Throughout the State VI, VII, on oak and willow.

EUPRISTOCERUS Deyr.

- E. cogitans* Web. Boonton VII, 4 (GG); Palisades V, 7 (Lv); Hudson Co. (Li); Newark Dist. (Bf); Jamesburg VII, 4 (Brn); Westville (Li); Camden, Gloucester Co. (W); breeds in alder and is locally not rare.

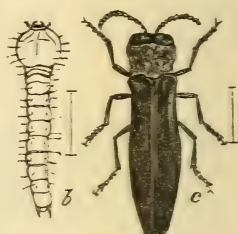


Fig. 112.—Blackberry gall maker: *b*, larva; *c*, adult; all enlarged.

AGRILUS Steph.

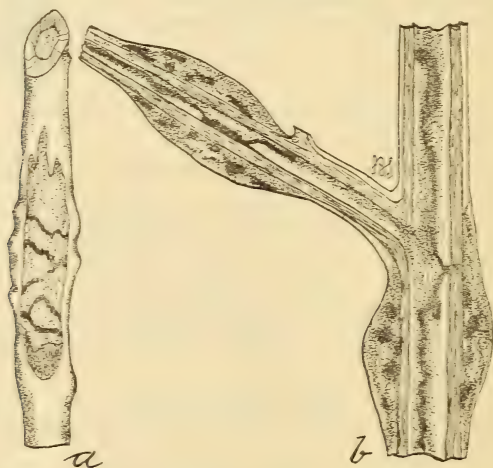


Fig. 113.—Blackberry gall: *a*, swellings just begun over recent borings; *b*, section through an old stem to show appearance of gall.

- A. ruficollis* Fab. Common throughout the State in June. The larva bores in stems of blackberry and raspberry, forming galls on some varieties and becoming more or less injurious. Cutting out the galls and burning the cuttings in winter destroys the brood. As the eggs are all laid by July 1st, cutting out all shoots made at that time and depending upon those starting after that date will secure exemption for the year next following.
- A. lateralis* Say. Eagle Rock (Bf); Staten Island (Lg); West Berlin VI, 25 (Brn); Buena Vista (Li); Brown's Mills VII, 4, Lacy VII, 14 (Dke); always rare.

- A. otiosus* Say. Throughout the State, sometimes common; breeds in hickory, oak, locust, etc. The variety "defectus" Lec. occurs with the type.
- A. arcuatus* Say. Westville (Li); DaCosta VII, 28, Lacy VII, 14 (Dke); So. Jersey (W); not common; found on and probably breeds in hazel.
- A. vittaticollis* Rand. Hewitt VI, Newfoundland VII, Lakehurst VII (Jl), Buena Vista (Li); Clementon V, 30 (GG); Sea Isle VI (Brn); breeds in Kalmia and chestnut.
- A. bilineatus* Web. Throughout the State VI, 1-VII, 10, not rare; the larva is injurious to chestnuts and also attacks oaks (Ch).
- A. granulatus* Say. Boonton VII, 4 (GG); Staten Island (Lg); Cramer Hill VI, 19, Gloucester VII, 1 (Brn); So. Jersey (W); never common.
- A. anxius* Gory. The bronze birch borer; appeared as an injurious species on cut-leaved birch in Essex County cities and towns in 1908-09. Up to that time recorded as "rare in So. Jersey" (W).
- A. acutipennis* Mann. Newfoundland VII, 6, Hewitt VI, 12, Lakehurst VII, 12 (Jl); Woodside (Bf); Woodbury, Malaga, Brown's Mills VI (Dke), Atco, DaCosta VI (Brn).
- A. politus* Say. Boonton VII, 4 (GG); Madison VI, 10 (Pr); Hudson Co. (Li); Newark (Soc); So. Jersey (W); breeds in willow and oak.
- A. sinuatus* Oliv. Local in Essex, Union and Middlesex Counties; breeds in the sap wood of pear. An introduced species that is being gradually worked out and now occurs only in a very few trees so far as known. It also breeds in "Cratægus," and a few specimens are found on such stock annually.
- A. fallax* Say. Camden and Gloucester Co., several localities V, 20-VI, 15, always rare (div).
- A. obsoletoguttatus* Gory. Throughout the State V, VI, on oak.
- A. subcinctus* Gory. Madison (Pr); Camden III, 22 (Brn); Westville (Li); So. Jersey (W); not common.
- A. lecontei* Saund. Hudson Co. (Li); South Jersey (W).
- A. imbellis* Cr. West Berlin VI, 25, Atco VI, 17, DaCosta VII, 5 (Brn).
- A. egenus* Gory. Throughout the State late May and all June; found on and probably breeds in willow and locust.
- A. pusillus* Say. South Jersey, not common (W).

RHÆBOSCELIS Chev.

- R. tenuis* Lec. Greenwood Lake V, 17, Lakehurst V, 29, VII, 12, IX, 3 (Jl); Gloucester VII, 1 (Brn); Anglesea VII, on low plants in swampy glades (W).

TAPHROCERUS Sol.

- T. gracilis* Say. Throughout the State IV-VIII, locally not rare; found beating in swampy meadows.

BRACHYS Sol.

- B. ovata** Web. Common throughout the State VI-VIII, on oak. The variety "tessellata" Fab. occurs with the type.
- B. ærosa** Mels. Throughout the State V, VI; not rare, on oak.
- B. æruginosa** Gory. Woodbury V, 24, Iona V, 28, VI, 8, Lucaston V, 30 (Dke).

PACHYSCHELIS Sol.

- P. purpureus** Say. Madison X, 15 (Pr); Ft. Lee (Sf); Orange Mts. VI, 4 (Bf); Hemlock Falls V, 28 (W); larva mines leaves of "Lespedeza" (Sz).
- P. lævigatus** Say. Throughout the State late V and all VI.

Family LAMPYRIDÆ.

This family contains the "fireflies" and "soldier beetles." They are long, narrow, somewhat flattened species, with soft, leathery wing-covers and a flexible abdomen. The antennæ are usually long, the joints more or less obviously serrated and sometimes even flabellate in the male. The interesting feature in a number of the species is the power of emitting a phosphorescent light from the tip of the abdomen. This light is entirely in the control of the insects, and varies in color and intensity in the different species. The "glow-worms" that are sometimes seen in the grass or under stones are larvæ or wingless females, and these may have luminous points along the sides of the body as well as at the tip. In the larval stage they feed on snails or on other soft-bodied insects.

The "soldier beetles" have a more prominent head and narrower thorax; but are of the same soft body texture. The larvæ are fusiform, flattened above and also predatory in habit, feeding upon soft-bodied larvæ or grubs when they enter the earth to pupate. They are distinctly useful as checks to a large series of injurious species, including such pests as the plum curculio.

LYCOSTOMUS Mots.

- L. lateralis** Mels. Eastern New Jersey (Dietz).

CALOPTERON Guer.

- C. terminale** Say. Boonton VI, VIII, Riverton VI, Merchantville VI, Westville VI, Clementon VIII, IX, Pemberton IX (GG); Great Notch VII, Laurel Sp. VI, Lucaston VIII, IX (Dke); Plainfield VII (Dow); Hudson Co. (Ll).
- C. reticulatum** Fabr. Throughout the State VII-IX; not rare.

CELETES Newm.

- C. basalis** Lec. Hudson Co. (Ll); Lahaway VI (Sm); Malaga VIII (GG); Iona VI (Brn); seashore from Sandy Hook to Cape May VI, VII, in wash-up (div).

CÆNIELLA Ckll. (CÆNIA Newn.)

- C. dimidiata* Fab. Caldwell (Cr); Atco (W); Sea Isle V, 24, Anglesea VI, 15 (Brn); not common.

LOPHEROS Lec.

- L. fraternus* Rand. Paterson (Sm).

EROS Newn.

- E. thoracicus* Rand. Westville, rare (Li).
E. aurora Hbst. Throughout the Delaware Valley, pine barren and maritime faunas IV, V, and sometimes locally common.
E. humeralis Fab. Jamesburg VI, 16 (Sm); Seaville VI, 11 (Brn).
E. trilineatus Mels. Hudson Co. (Li); Middlesex Co., Jamesburg, Lahaway, all VII (Coll); Lucaston VI, 27 (Dke); Westville (Li); South Jersey (W).

PLATEROS Bourg.

- P. timidus* Lec. Hudson Co. (Li); Woodside VI, 27 (Br).
P. modestus Say. Hudson Co. (Li); Middlesex Co., VII, So. Jersey VII (Sm); Iona VI, 8, Brown's Mills VI (Dke); Atco (Li); g. d. (W).
P. canaliculatus Say. Hudson Co. (Li); Jamesburg VII, VIII, Sandy Hook VII (Sm); Iona VI, 16 (Dke); g. d. (Li).
P. floralis Mels. Middlesex Co. VII, Jamesburg VII (Sm); Spring Lake IX (Ch); Lakehurst VII (Bf); Atco (Li); DaCosta VII, 20 (Dke).

CALOCHROMUS Guer.

- C. perfacetus* Say. Orange Mts. (Sm); Malaga VII, VIII (GG); rare.

POLYCLASIS Newn.

- P. bifaria* Say. New Jersey, in Dietz coll (Sf).

LUCIDOTA Lap.

- L. atra* Say. Throughout the State, nearly all season.
L. punctata Lec. DaCosta (Li).

ELLYCHNIA Lec.

- E. corrusca* Linn. Throughout the State all season; the variety "autumnalis" Mels. with the type and equally common.

PYROPYGA Mots.

- P. nigricans* Say. Hudson Co. (Li); Irvington VI, 30, Jamesburg IV (Coll).
P. decipiens Harr. Throughout the State VI, VII.

PYRACTOMENA Lec.

- P. angulata* Say. Throughout the State VI, VII, nowhere common; perhaps the most brilliant of our fire-flies.
- P. ecostata* Lec. Anglesea VII, in salt meadows; the larvæ in the marshes among snails (div).
- P. lucifera* Mels. Throughout the State south of the Piedmont plain from mid-May through June.

PHOTINUS Lap.

- P. consanguineus* Lec. Hudson Co. (Li); Orange Mts. and Newark Dist. (div); Anglesea (W); g. d. (Li).
- P. lineellus* Lec. Orange (Ch); Atco (Li); rare.
- P. pyralis* Linn. Piedmont plain and northward, in June; a moderate-sized species with quite a bright light.

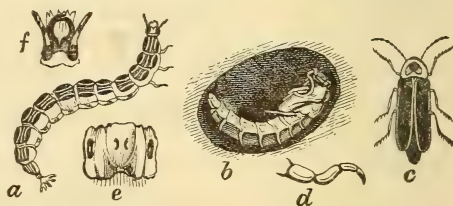


Fig. 114.—Fire-fly, *Photinus pyralis*: a, larva; b, pupa in underground cell; c, adult; d to f, enlarged details of larva.

- P. marginellus* Lec. Throughout the State VI, VII; locally the most common form; flies low and has a yellow light. The female is half-winged and does not fly.
- P. scintillans* Say. Throughout the State, usually the most common form; flies VI, lingers until VIII; habits and light as in preceding.

PHOTURIS Lec.

- P. pennsylvanica* DeG. Throughout the State VI to VII, 15; the largest and most brilliant of our common species; flies high and shines with a greenish light; locally absent.
- P. frontalis* Lec. Riverton VI, 17, VII, 3 (GG); Anglesea VII (div). Smaller than the preceding, but with a similar light.

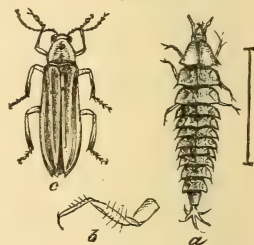


Fig. 115.—*Photuris pennsylvanica*: a, larva; b, its leg; c, adult; a and b enlarged.

PHENGODES III.

- P. longicornis* Barber. (*plumosa* Oliv.) Chester V, 29 (Marsh); Palisades VI, 22 (Dke); Staten Island (Ds). The males of these species are not luminous; but the larvæ and wingless females which are found under stones are the most brilliant of all our forms, giving off light from lateral points along the body. They are extremely rare. Mr. Joutel records a larva Newfoundland VII, 4.
- P. laticollis* Lec. Orange VI, 20 (Ch); Lahaway V, 15, VI, 24 (Coll).

TYTTHONYX Lec.

- T. erythrocephalus** Fab. Newark VII (Brn) and south of Piedmont Plain throughout the State in VII; not common.

OMETHES Lec.

- O. marginatus** Lec. Atco, rare (Li); New Jersey (Sf).

CHAULIOGNATHUS Hentz.

- C. pennsylvanicus** De G. Throughout the State VIII, IX, often on golden rod. One of the "soldier beetles," which, in the larval stage, devours larvæ and pupæ of the plum curculio, etc.

- C. marginatus** Fabr. A very similar species occurring in spring and early summer; also g. d., and with the same habits.

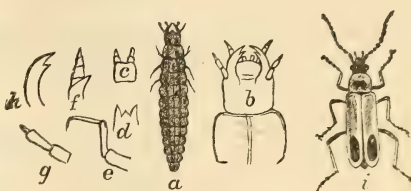


Fig. 116.—Soldier beetle, *Chauliognathus pennsylvanicus*: a, larva; i, beetle; other letters refer to structural details.

PODABRUS Westw.

- P. tricosatus** Say. Hopatcong (Pm); Boonton VI, 5 (GG); Orange (Ch); Hudson Co. (Li); Montclair, Lahaway VI (Sm).
- P. rugulosus** Lec. Hudson Co. (Li); g. d. (W, Li); Lucaston V, 30 (Dke).
- P. frater** Lec. Hopatcong (Pm); New Brunswick, Burlington Co. VII, Lahaway V, 12, VII (Coll); Westville (Li); Lucaston VI, 27 (Dke).
- P. basilaris** Say. Throughout the State VI, VII, not rare.
- P. diadema** Fab. Gloucester (Li); Anglesea VI, 26 (Sm).
- P. modestus** Say. Hopatcong (Pm); Caldwell (Cr); Atco (Li); Atlantic Co. V, 25 (Sm).
- P. comes** Lec. Orange Mts., rare.
- P. tomentosus** Say. Generally distributed, rare (Li).
- P. protensus** Lec. Hudson Co. (Li); Newark (Bf).
- P. brunnicollis** Lec. Atco, rare (Li).

SILIS Latr.

- S. percomis** Say. Clementon V, 6 (GG).

TELEPHORUS Schaff.

- T. dentiger** Lec. Boonton V, VI (GG); Hudson Co. (Li); Newark V (Soc); Highlands (Ch).
- T. excavatus** Lec. Hudson Co. (Li); Montclair VI (Bf); Rocky Hill VI (Dn); Spring Lake (Ch); Clementon VI (GG); DaCosta (Li); Lahaway V, VI, Anglesea V (Coll).

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- T. fraxini* Say. Cramer Hill V, 30 (GG); Atco (Li); g. d. (W).
T. carolinus Fab. Throughout the State V-VII, common.
T. lineola Fab. Also common throughout the State.
T. rectus Mels. South River VII (Coll); Atco VI, Clementon VI (GG); g. d. (W).
T. flavipes Lec. Hopatcong (Pm); Newark (Soc); Glassboro VII, 7 (GG).
T. scitulus Say. Throughout the State, very common until midsummer. All our species occur on flowers or on foliage.
T. pusillus Lec. Lakehurst VII (Bf); Atco (Li); Lucaston VIII (Dke).
T. rotundicollis Say. Hopatcong (Pm); Boonton VI (GG); Hudson Co. (Li); Newark (Soc); New Brunswick (Coll); Westville (Li); Woodbury VI (Dke).
T. tuberculatus Lec. Throughout the State IV-VII; locally common.
T. bilineatus Say. Throughout the State IV-VI; not common.
T. marginellus Lec. Pitman Grove VII, 21, Clementon VII, 13 (GG).

POLEMIUS Lec.

- P. laticornis* Say. Jamesburg VII (Lg); New Jersey (Dietz).
P. undulatus Lec. Anglesea VI, 20 (Coll).

DITEMNUS Lec.

- D. bidentatus* Say. Throughout the State V-VIII; locally not rare.

TRYPHERUS Lec.

- T. latipennis* Germ. Hopatcong (Pm); Boonton VI (GG); Hudson Co. (Li); Newark VII, 4 (Brn); Atco (Li); Anglesea (W).

MALTHINUS Latr.

- M. occipitalis* Lec. Woodside VI, 27 (Bf); Westville (W); Atco (Li); Anglesea V, 28 (Sm); rare.

MALTHODES Kies.

- M. concavus* Lec. Hudson Co. (Li).
M. spado Lec. Eastern New Jersey (Dietz).

THELYDRIAS Mots.

- T. contractus* Mots. This odd little species, described in our fauna as "Ignotus ænigmaticus" is a recent introduction, and as yet found only in entomological collections in and near New York City, where it functions as a museum pest of the first order. Its systematic position is in doubt, and its reference here is due to its relation to the "Drilini," of which we have no representatives. The possibilities of injury to stored products should this insect spread cannot yet be estimated.

Family MALACHIDÆ.

The members of this family resemble the "Lampyridæ" in the generally soft wing-covers and body, but they are shorter and broader, the elytra not nearly so long and often a little truncated posteriorly, the broadest part of the body near the end of the wing covers. In the species of "Collops" there are orange-colored protrusible vesicles at the sides of the thorax, which are supposed to be defensive in character. The antennæ are short, a little enlarged at the tip and often curiously knotted in the male.

All of them are found on flowers or herbage, some only in moist or low places, where they are said to feed on insect eggs, larvæ and smaller insects generally. The larvæ, so far as known, are predaceous.

COLLOPS Er.

- C. tricolor** Say. Sea Girt (Bf).
- C. eximius** Er. Throughout the State VI-VIII; not rare.
- C. nigriceps** Say. Hudson Co. (Ll); g. d. (W).
- C. 4-maculatus** Fab. Our most common species throughout the State.

TEMNOPSOPHUS Horn.

- T. bimaculatus** Horn. Lakehurst VI, VII (div); 5-mile beach VII, 5 (W).

ANTHOCOMUS Er.

- A. flavilabris** Say. Hudson Co. (Ll).

PSEUDEBÆUS Horn.

- P. bicolor** Lec. Anglesea (W).
- P. oblitus** Lec. Hopatcong (Pm); Hudson Co. (Ll); Woodside (Bf); Orange Mts., New Brunswick VII, 20 (Coll).

ATTALUS Er.

- A. nigrellus** Lec. Hopatcong (Pm).
- A. terminalis** Lec. Hopatcong (Pm); Hudson Co. (Ll); Jamesburg VII, 15, Ocean Co. (Coll); Glassboro VII, 30 (GG); Atco VII, 14, Anglesea V, 30 (Brn).
- A. varians** Horn. Anglesea (W).
- A. morulus** Lec. Hudson Co. (Ll); Orange Mts., Lahaway VI, 1 (Coll).
- A. granularis** Er. DaCosta (W); Anglesea VII (Sz).
- A. otiosus** Say. Anglesea (W).
- A. circumscriptus** Say. Atco (Li).
- A. scincetus** Say. Throughout the State V, VI; not rare.

The records of "Pristoscelis" in the last edition were based on erroneous identifications.

Family CLERIDÆ.

The flower beetles are firmer in texture than those of the last preceding families, yet not so hard-shelled as are the click beetles. The antennæ are usually more or less serrated or saw-toothed, but may also have a distinct club or comb at tip. The head is of good size with rather prominent eyes, the thorax being usually narrower than either head or elytra. The latter completely cover the elytra and are often clothed with hair. In color they vary but are usually bright, sometimes shining and often prettily banded. The beetles may be found on flowers or running on the trunks of trees, where they somewhat resemble ants in their motions. The species of "Necrobia" live in all stages on carrion and form the exception in a family in which most of the larvæ thus far known are predatory. These larvæ are usually red or brown in color and are found under bark or in the burrows of wood-borers, upon which they feed. Their work in this direction is done under cover and is rarely noticed, hence the extent of the benefit derived from them is not appreciated.

MACROTELUS Klug. (ELASMOCERUS Lec.)

- M. terminatus* Say. Boonton VI, 14 (GG); Ft. Lee (Jl); Orange Mts. (Bf); Cape May VI, 3 (Brn); larvæ in burrows of "Scolytids" and "Bostrichids" in hemlock, oak and grape-vines.

CYMATODERA Gray.

- C. bicolor* Say. Ft. Lee V (div); Orange Mts. (Bf); Jamesburg VII, 2 (Jl); Lahaway VII, 5 (Coll); Westville (Li); g. d. (W); not common.
C. inornata Say. Ft. Lee (Sf); Hudson Co. (Li); Lakehurst VII, 19 (Jl); Bamber VI, 3 (W); Atlantic City VI, 24 (Brn).
C. balteata Lec. Palisades, Spotswood (Jl); Highlands (Dietz); Bordentown VII, Lahaway IX (Coll); Riverton VIII (Jn); Camden (Li); DaCosta VII (W).

PRIOCERA Lec.

- P. castanea* Newm. Ft. Lee (Sf); Palisades VIII, 2 (Jl); Lakehurst VII (div); on pine.

TRICHODES Hbst.

- T. apivorus* Germ. Normanock VII (Ds); Lakewood VII (Jl); Malaga VIII (GG); Newtonville VI (Brn); DaCosta VI, VII (W); on flowers of "Spiræa."

CLERUS Geoff.

- C. 4-signatus* Say. Boonton IV, 29, Riverton IV, 20, Malaga VII, VIII (GG).
C. 4-guttatus Oliv. Throughout North Jersey IV-VI, on pine; Glassboro III, 28 (CG). This is the form with red abdomen, and extends rarely into South Jersey.

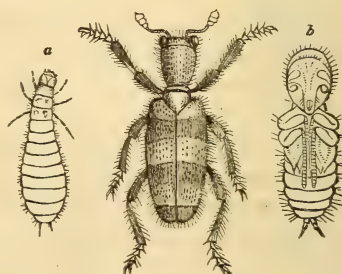


Fig. 117.—*Trichodes apivorus*: a, larva; b, pupa; adult beetle in center; enlarged.

- C. nigrifrons* Say. This is the common South Jersey form, is more slender and has a black abdomen (Jl). The two are mixed in collections.
- C. rosmarus* Say. Throughout the State VI, VII; common.
- C. lunatus* Spin. Throughout the pine barrens and maritime, and extends a little into the Delaware River region; VI, VII.
- C. ichneumoneus* Fab. Lakehurst VII, 15, on pine (Jl); Riverton V, 20, Woodbury V, 22, Clementon V, 30 (GG).
- C. thoracicus* Oliv. Throughout the State V-VIII, locally common; on deciduous trees and flowers.

THANASIMUS Latr.

- T. dubius* Fab. Throughout the State, local, not common, III, IV, VIII, X.

THANEROCLERUS Spin.

- T. sanguineus* Say. Rare under bark throughout the State.

HYDROCERA Newm.

- H. unifasciata* Say. Madison VII, 28 (Pr); Ft. Lee VI, VII (Jl); Orange Mts., Woodside (Bf); Hudson Co. (Ll); Atco (Li); Clementon V (GG); g. d. (W); rare.
- H. subænea* Spin. Orange Mts., Newark VI, VII, Ocean Beach (Bf).
- H. humeralis* Say. Throughout the State V-VII, common; the var. "cyanescens" Lec. everywhere with the type; the var. "difficilis" Lec. more rarely and local.
- H. pallipennis* Say. Throughout the State VI, VII; not rare.
- H. verticalis* Say. With the preceding and more common.
- H. tabida* Lec. Staten Island VI (Ds); DaCosta (Li); Sea Isle, Avalon, Anglesea VI (Brn); rare.
- H. longicollis* Ziegl. Madison (Pr); E. Jersey (Dietz), Atco VII (div); Gloucester, Newtonville, DaCosta, all VII, Sea Isle VI, 26 (Brn); 2-mile beach VII (Dke).

The record of "pedalis" Lec. is an error of identification.

ICHNEA Lap.

- I. laticornis* Say. Hopatcong (Pm); Ft. Lee (Sf); Palisades VI, 19, bred from hickory infested by "Scolytus" (Lv); Newark Dist., g. d. (Bf).

PHYLLOBÆNUS Spin.

- P. dislocatus* Say. Hopatcong (Pm); Ft. Lee (Sf); Hudson Co. (Ll); Camden (Li); DaCosta (W); on dead branches and in sweeping.

CHARIESSA Perty.

- C. pilosa* Forst. Throughout the State V-VIII; locally not rare. The larva occurs in burrows of wood borers, and it is probable that this

species is responsible for the gradual destruction of the sinuate pear borer, which needs two years to attain full growth, and is long in the helpless pupal stage. The variety "onusta" Say. is less frequent than the type.

The records of "*C. vestita*" Spin. and "*C. dichroa*" Lec. are based on erroneous data.

CREGYA Lec.

C. vetusta Spin. Highlands (Dietz); Westville (Li); g. d. (W); rare.

C. oculata Say. Throughout the State VI-VIII; locally not rare.

ORTHOPLEURA Spin.

O. damicornis Fabr. Hopatcong (Pm); Palisades, Staten Island III, 16 (Jl); Boonton VII, 17, Malaga VII, 20 (GG); Orange Mts., Newark (Bf); Woodbury VII, 30, Collingswood VIII, 2 (Brn); not common.

LARICOBIVS Rosen.

L. erichsoni Rosen. Orange Mts., rare (Bf); Staten Island (Lg).

NECROBIA Latr.

N. rufipes Fabr. The "red-legged ham beetle"; occurs throughout the State, is cosmopolitan and found on drying meats, carrion, bones, fish, cheese, etc. (Ch).

N. ruficollis Fabr. With the preceding, and much more common.

N. violacea Linn. Same habits and distribution as before and easily recognized by the uniform blue coloration.



Fig. 118.—Red-legged ham beetle, *Necrobia rufipes*: a, larva; b, pupa; c, cocoon; d, e, beetle; natural size and enlarged; f to j, structural details.

Family PTINIDÆ.

A very interesting group of beetles, varying so greatly in form that no superficial description is sufficiently comprehensive to include all. They are hard in texture, and the elytra, which may be smooth, striate, shining, hairy or scaly, are not abbreviated, but cover the abdomen. The head is usually bent under, the antennæ are slender, sometimes evenly serrate, but more usually with a prominent serrate, lamellate or pectinated club. They live on dry animal and vegetable products, and some of them bore into the furniture and woodwork of houses, to their material injury. All sorts of things from Belladonna roots to cigars and gunwads are attacked and serve as food.

The larvæ occur with the adults, and are soft, white, grub-like creatures resembling miniature white-grubs, but covered with short stiff hair or bristles.

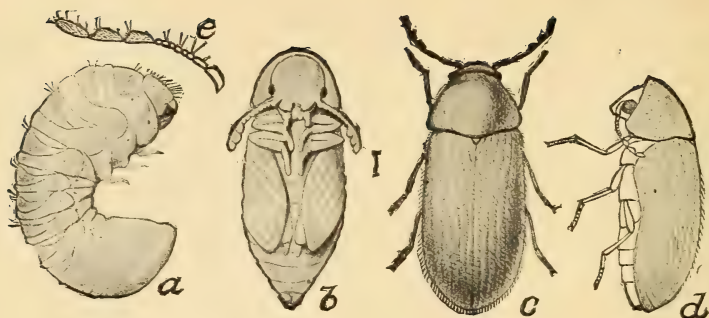


Fig. 119.

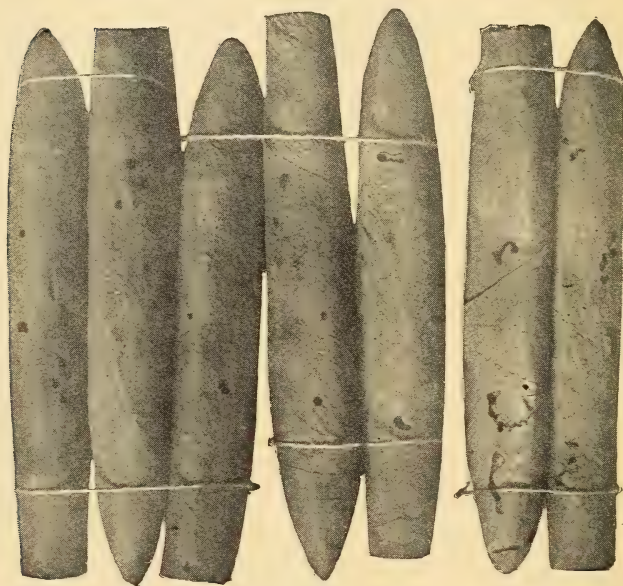


Fig. 121.

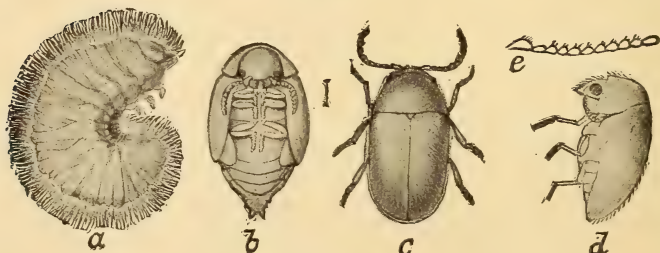


Fig. 120.

Fig. 119.—*Sitodrepa panicea*: a, larva; b, pupa; c, d, adult beetles.

Fig. 121.—Cigars eaten by larva of *Lasioderma*.

Fig. 120.—The cigarette beetle, *Lasioderma serricornis*: a, larva; b, pupa; c, d, adults; all enlarged.

GIBBIUM Scop.

- G. psylloides** Czemp. Breeds in dried animal matter and excrement in houses; occurs in the New York Produce Exchange and in store-houses in New Jersey.

MEZIUM Curt.

- M. americanum** Lap. Occurs with the preceding in city store-houses.

PTINUS Linn.

- P. brunneus** Duft. Camden, rare (Li); lives in store-rooms, cellars, granaries and old houses, develops in dried organic matter.
- P. fur** Linn. With the preceding, but more common, and recorded from all sections of the State. Mr. Bischoff finds it on old rags.

EUCRADA Lec.

- E. humeralis** Mels. Hopatcong (Pm); Ft. Lee (Sf); Orange Mts. VI, 9 (Bf); New Brunswick (Coll); not common.

OZOGNATHUS Lec.

- O. floridanus** Lec. Anglesea VII, 1, Cape May VII, 7, on dead oak twigs (W); a South Atlantic Coast form.

ERNOBIUS Thoms.

- E. mollis** Linn. Ft. Lee (Sf); Orange Mts. VI, Newark (Bf); Lahaway (Sm); Pitman Grove VII (GG); probably throughout the State on old wood. A common European species.
- E. filicornis** Lec. Atlantic Coast region, Mass. to Virginia, rare (Fall).
- E. granulatus** Lec. Brigantine Beach IX (Hn); New Jersey (Fall).
- E. luteipennis** Lec. Westville V (div); Gloucester Co. IV, V (div); Malaga V, 15 (W); Clementon V, 6 (GG).

OLIGOMERUS Redt.

- O. sericans** Mels. Orange Mts. (Bf); Lahaway VI (Sm); Anglesea VII (div).
- O. obtusus** Lec. Staten Island, New Jersey (Fall).
- O. alternatus** Lec. Anglesea VI, 18, South Jersey (W).

SITODREPA Thoms.

- S. panicea** Linn. Throughout the State; breeds in dry roots and stored vegetable products of all kinds; also in rattan, willow and wood-work, in paper, paste-board and similar stores. Liberal applications of gasoline, where practical, or exposure to the fumes of the bisulphide of carbon may be resorted to to destroy the pests.

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TRICHODESMA Lec.

- T. klagesi** Fall. Occurs with and is usually mixed with "gibbosa" in collections (Fall).
T. gibbosa Say. Newark, Orange Mts. VI (Bf); Westville (Li); Gloucester (W); Burlington Co. VI (GG); always rare.

ANOBIUM Fabr.

- A. striatum** Oliv. (*Hadrobregmus pumilis* Lec.) Orange Mts., rare (Bf); DaCosta (Brn). An introduced species.

HADROBREGMUS Thoms.

- H. carinatus** Say. (errans Mels.) Orange Mts., Union, Newark V (Bf); Westville (Li); Anglesea VII (div); on dead branches; not common.

CÆLOSTETHUS Lec.

- C. notatus** Say. (*Anobium*) Madison V, 14 (Pr); So. Jersey (W); Anglesea VI, 2 (Sm). "Quadrulus" Lec. is a Pacific Coast species.

TRYPOPITYS Redt.

- T. sericeus** Say. Hopatcong (Pm); Madison (Pr); Millburn, Hudson Co. VI (Bf); Palisades, Lahaway (Sm); Anglesea VII (W); on dead branches.

XYLETINUS Latr.

- X. peltatus** Harr. Orange Mts., on hickory (Bf); Farmingdale VII, 17 (GG); Anglesea (W); g. d. (Li); always rare.
X. harrisii Fall. New Jersey (Fall); Anglesea (W).
X. fuscatus Lec. Caldwell (Cr).
X. lugubris Lec. Orange Mts., rare (Bf).

LASIODERMA Steph.

- L. serricorne** Fabr. Throughout the State; the "tobacco" or "cigarette beetle." Attacks tobacco in all forms and breeds also in dry vegetable products, like "Sitodrepa." Its general habits and the measures to be adopted against it are similar.
L. semirufum Fall. Anglesea VII, 4; one of the type localities.
L. hemiptychoides Fall. Anglesea VII, 4, 11 (div); one of the type localities.

PETALIUM Lec.

- P. seriatum** Fall. Iona VI, 8, Sea Isle VI, Anglesea VI, 21 (Brn).
P. bistriatum Say. Orange Mts. (Bf); So. Jersey (W); Anglesea VII (Sz); g. d. (Li); locally common.

EUPACTUS Lec.

- E. nitidus** Lec. Hudson Co. (Li); Orange Mts. (Bf); Anglesea VII, 1 (W).

CATORAMA Guer.

- C. sectans** Lec. Anglesea (W); a Texan form and the identification may prove incorrect; Fall records a "New York" specimen.
- C. dichroum** Fall. Anglesea VII, 1 (W).
- C. nigritulum** Lec. Woodbury VII, 7 (Brn).
- C. vexatum** Fall. Camden VI, Woodbury VII, DaCosta VII (Brn); Clementon VII, 15, Bamber VI, 3, Anglesea VII, 1 (W).
- G. grave** Lec. (*Hemiptychus*) Bamber VI, 3, Anglesea VII (W); on dead wood.
- "*H. similis*" Lec. is strictly southern and does not occur in New Jersey.
- C. indistinctum** Fall. Bamber VI, 3, Anglesea VII, 1 (W).

CRYPTORAMA Fall.

- C. holosericeum** Lec. Anglesea (W).

PROTHECA Lec.

- P. hispida** Lec. Fort Lee (Sf), Anglesea (W).
- P. puberula** Lec. Orange Mts. (Bf); So. Jersey (W); rare.

DORCATOMA Hbst.

- D. dresdensis** Hbst. A common European species, found throughout the eastern U. S., south to Virginia (Fall).
- D. setulosum** Lec. Anglesea VII, 1 (W); on dead branches.

EUTYLISTUS Fall.

- E. intermedius** Fall. Anglesea (W).
- E. incomptus** Lec. DaCosta VII, 16 (Brn); Anglesea VII, 1 (W).

CÆNOCARA Thoms.

- C. scymnoides** Lec. New Jersey (Fall).
- C. oculata** Say. Common throughout the State.
- C. bicolor** Germ. Orange, New Jersey (Fall).
- C. tenuipalpa** Fall. Anglesea VI, 26 (Brn).
- C. inepta** Fall. New Jersey (Fall).

PTILINUS Geoff.

- P. ruficornis** Say. Ft. Lee (Sf); Orange Mts. (Bf); Landisville (Li); always rare.

Family **BOSTRYCHIDÆ.**

Separated from the "Ptinidæ" by the generally more elongated cylindrical form and other less obvious structural characters. I have retained our genera and species as in the old list.

ENDECATOMUS Mell.

E. reticulatus Hbst. G. d. (Bf, Li); in fungus under bark; not rare.

The record of "*E. rugosus*" Rand. is an error.

SINOXYLON Duft.

S. basillare Say. Ft. Lee (Bt); Orange Mts. VI, at light (div); Woodbury VII (div); Camden VI, Peermont VI (Brn); g. d. (W); boring in dead twigs.

S. bidentatum Horn. Hopatcong (Pm); Orange Mts. (Bf); Camden VI, 18 (Brn).

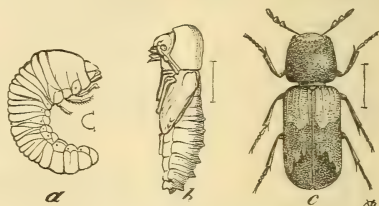


Fig. 122.—*Sinoxylon basillare*: a, larva; b, pupa; c, adult; enlarged.

AMPHICERUS Lec.

A. bicaudatus Say. The "apple-twig borer," found throughout the State more or less commonly. The adult bores into apple twigs in spring, at a bud, and makes galleries varying in length for food and shelter only. The larvæ live in roots of the green or "cat-brier" and in dead grape vines. Remedial measures, therefore, look to getting rid of such breeding places.

BOSTRYCHUS Geoff.

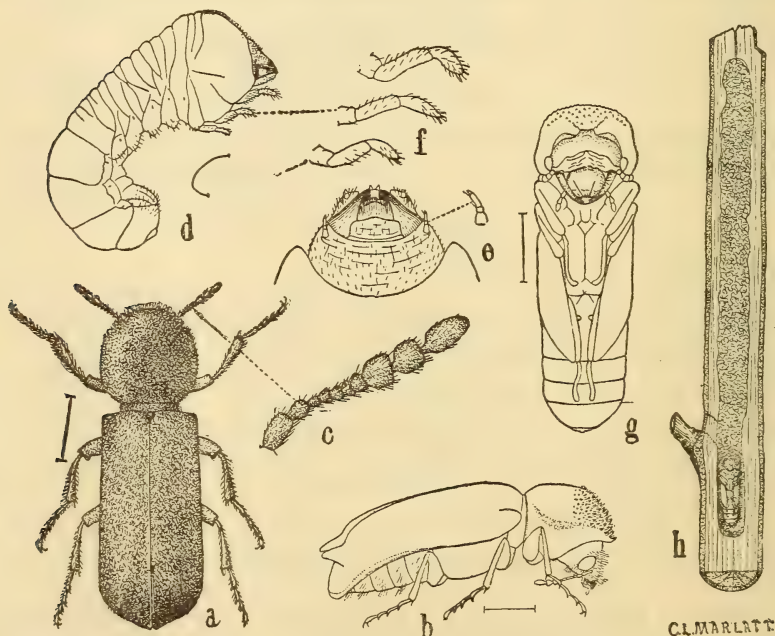


Fig. 123.—The "apple twig borer": a, beetle from above; b, same in outline from side; c, e, f, structural details; d, larva; g, pupa; h, same in larval burrow; all save h enlarged.

CLMARLATT

- B. bicornis** Web. Throughout the State V-VII, often at light; bores into dead twigs and branches.
- B. truncaticollis** Lec. Orange Mts., Newark VI, 16 (Bf).
- B. capucinus** Linn. Newark and vicinity; an imported species introduced originally in sweet-wood at a licorice factory; has established itself and spread slowly, one specimen being recorded by Mr. Joutel from Bronx Park.

DINODERUS Steph.

- D. porcatus** Lec. Newark at light (Bf); seashore (Li).
- D. hispidulus** Casey. New Jersey (Casey).
- D. cribratus** Lec. Newark Dist. (Bf); Boonton V, Woodbury VII, Avalon VII (GG); Atlantic City VI (Brn); g. d. (Li).

LYCTUS Fabr.

- L. striatus** Mels. Hudson Co. (Li); Newark (Soc.) and probably throughout the State; bores into dry wood of furniture and trimmings and often does a great deal of mischief that is hard to avoid.
- L. opaculus** Lec. Ft. Lee (Bt); Hudson Co. (Li); Orange Mts., common (Bf); larva breeds in grape stems and adults attack wood used in manufacturing implements and furniture (Ch).

Family CUPESIDÆ.

Contains only two species of very long, somewhat flattened and roughly sculptured beetles. The head and thorax are narrower than the wing covers and the eyes are prominent. The general color is brown, and the elytra is very beautifully sculptured in impressed rows separated by elevated ridges. They are found on dead wood or under bark, and are of no economic importance.

CUPES Fabr.

- C. concolor** Westw. Madison VIII (Pr); Palisade district, in oak stumps VI (div); Orange Mts. (Bf); New Brunswick VII (Gr); Gloucester (W); never common.
- C. capitatus** Fabr. Ft. Lee VI (Bt); Caldwell (Cr); New Jersey (Li).

Family LYMEXYLIDÆ.

Only a single species occurs in our fauna, and that is very rare. It is brown in color, very long, slender, cylindrical, tapering posteriorly and covered with a very fine silky pubescence. The larva is a borer, whitish and very slender, and its very small irregular galleries in old oak wood are not infrequently seen. The European "*L. navale*" is very destructive

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to ship timber, and in our Southern States an allied species is injurious, but in New Jersey no notable harm is occasioned by them.

LYMEXYLON Fabr.

- L. sericeum* Harr. Newark (Bf); Gloucester (W); Sea Isle VII, 4 (Brn); Lakehurst VII, 4; single specimens only.

Family CIOIDÆ.

Small, oblong beetles, brown or black in color, convex above, with short, clubbed antennæ, the head retracted, though not concealed. They live in fungi or decaying wood, and are not of economic importance. The larvæ occur with the adults, and are grub-like in form.

CIS Latr.

- C. fuscipes* Mell. Hopatcong (Pm); Hudson Co. (Ll); Newark Dist. (div); New Brunswick (Coll).
C. creberrima Mell. Snake Hill (Sf).
C. horridula Casey. Snake Hill (Sf).

ORTHOCIS Casey.

- O. punctata* Mell. Anglesea VII (Sz); g. d. (W); probably throughout the State.

XESTOCIS Casey.

- X. levettei* Casey. New Jersey (Casey). There are three other species so distributed that their occurrence in New Jersey is almost certain.

BRACHYCIS Casey.

- B. brevicollis* Casey. Sure to occur in New Jersey (Sf).

ENNEARTHRON Mell.

- E. thoracicornæ* Ziegl. Ft. Lee VI (Bt); Anglesea VII (Sz); and I have taken it generally in small numbers throughout the State.

CERACIS Mell.

- C. sallei* Mell. East Jersey (Dietz); Chester, Arlington (Dn).

OCTOTEMNUS Mell.

- O. lævis* Casey. Snake Hill (Sf).

RHIPIDANDRUS Lec.

- R. paradoxus* Beauv. Ft. Lee (Sf); on hard fungus in old trees (Brn).

Family SPHINDIDÆ.

Very similar to the "Cioidæ" in appearance and live in fungi. Our only species is

SPHINDUS Chev.

S. americanus Lec. Ft. Lee, Snake Hill (Sf); Newark (Bf); Anglesea (W); probably throughout the State; local and not common.

Family LUCANIDÆ.

These are the "stag beetles," so called because in some species the male has the mandibles very large, branched, resembling stag antlers. Our common species, however, are better known as "pinching bugs," the mandibles being of moderate size and not branched. The antennæ have a leaf-like club at tip, the blades of which cannot be closely opposed or folded. The larvæ are white-grubs and live in decaying wood.

LUCANUS Linn.

L. elaphus Fabr. Anglesea, one male (W).

L. dama Thunb. Throughout the State VI, VII, sometimes locally common at electric light; but usually in small numbers only.

DORCUS MacL.

D. parallelus Say. Throughout the State VI, VII, in white-rotten wood; locally common.

D. brevis Say. DaCosta (Say); Weymouth (Dke). The rank of this species is in doubt, and the general belief is that it is only an aberration of the above; but that is disputed, and the species is left here as good.

PLATYCERUS Geoff.

P. quercus Web. Recorded from all sections of the State; cut out of rotten wood in March, and found occasionally in branches until July.

CERUCHUS MacL.

C. piceus Web. Throughout the State; common in rotten beech all the year around (Bf).

NICAGUS Lec.

N. obscurus Lec. Gloucester, not common (W, Li).

PASSALUS Fabr.

P. cornutus Fabr. Common throughout the State in rotten wood; hundreds of them are sometimes found in an old stump, and on an abandoned branch of R. R., on 5-mile beach, they ate up all the old ties. The larvæ are peculiar in having four legs only.

Family SCARABÆIDÆ.

These are the "lamellicorn" beetles in which the antenna has an oval club composed of from three to seven leaves or lamellæ at the tip, and this is usually much longer in the male. The leaves are closely opposable, so that, when at rest, the club seems solid. The species vary much in appearance, and range from small to very large; in habit from feeders on leaves to burrowers in excrement. In all of them the legs are formed for digging, the fore-tibiæ being almost always flattened and toothed at the outer edge. The tarsi are generally long except on the fore-legs, and always 5-jointed, so that the species are easily recognizable.

The larvæ are white-grubs and live in decaying wood, in excrement, in decaying vegetation generally or in the ground on the roots of plants. They are white or yellowish in color, with a brown, horny head bearing prominent mandibles, and are much wrinkled and enlarged toward the posterior extremity, where they end in a smooth, obtusely rounded, often discolored sac. Their position is partly coiled up, the tip of the abdomen usually about touching the long spiny legs.

The feeders in decaying and excrementitious matter are useful or harmless; but so much cannot be said for those that feed under ground on the roots of plants. Grass lands are very apt to become infested, and sometimes lawns are completely destroyed by grubs which shear off every root, leaving the tops to wither. Field crops after grass often suffer severely, and in this State strawberries are among those most injured.

Remedial measures are unsatisfactory where once the grubs have established themselves, and methods in avoidance are usually recommended. Fall plowing old sod is good practice, and if chickens follow the plow or hogs are allowed to run in the infested field they will dispose of large numbers of them.

In rare cases, e. g. the rose-chafer, it is the adult and not the larva that becomes injurious, and the method of treatment must be modified accordingly. So "May beetles" or "June bugs" sometimes attack fruit blossoms by eating into the stem, and in such cases the arsenites are of use.

CANTHON Hoffm.

C. ebenus Say. Seashore, rare (Li). The species of this genus are "tumble bugs," making large pellets of dung, in which they lay their eggs and which they afterward bury.

C. lecontei Harold. Lakehurst VII (Bf); DaCosta VII (W); Clementon V, 22, Lucaston VIII, 27 (Brn); along shore Brigantine to Cape May VI, VII (div).

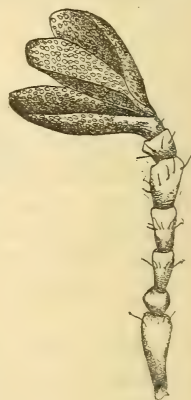


Fig. 124.—Antenna of a Lamellicorn beetle to show the structure of club.

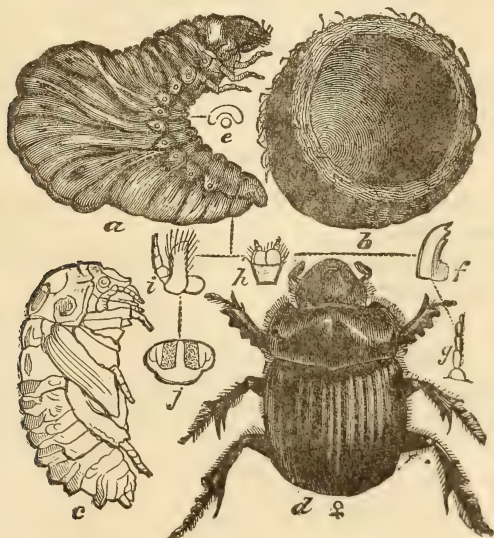
- C. probus* Germ. Lakehurst V, IX (div); some of the records for "lecontei" probably refer to this species; Mr. Schaeffer thinks all do.
- C. vigilans* Lec. Weehawken VI (Bt); Atlantic Co. (W); seashore (Li); rare.
- C. lævis* Dru. Common throughout the State.
- C. chalcites* Hald. New Jersey (Lg), and probably g. d.; rare.
- C. viridis* Beauv. Staten Island IV, VIII (div); Atlantic City (Li).

CHÆRIDIDIUM Lap.

- C. histeroides* Web. Lakehurst VII, IX (div); Woodbury VII (W); DaCosta VI, VII (div); Atco (Li); Petersburg VII, 4 (Brn); in excrement and fungi.
- C. lecontei* Harold. DaCosta VI, 2 (GG).

COPRIS Geoff.

- C. minutus* Dru. Throughout the State IV-IX; locally common in cow-dung; all the species with the habit of digging under droppings.
- C. anaglypticus* Say. Throughout the State; common, spring and fall.
- C. carolina* Linn. Our largest species; less common, but as widely distributed as the preceding.



—A "tumble-bug," *Copris carolina*: a, larva; b, the cell in which it lived; c, pupa; d, female beetle.

Fig. 125.

PHANÆUS MacL.

- P. carnifex* Linn. Throughout the State; locally common: spring and fall; one of the few species attracted to human excrement.

ONTHOPHAGUS Latr.

- O. nuchicornis** Linn. Greenville IX, 6, rare (Bf); throughout Camden and g. d. in Gloucester Counties IV-VI; an introduced species, spreading slowly.
- O. hecate** Panz. Throughout the State V-IX; common.
- O. janus** Panz. Common throughout the State in toad-stools, decaying fungi and under excrement. The varieties "orpheus" Panz. and "striatulus" Beauv. with the type, but much more rare.
- O. subæneus** Beauv. Lakehurst, spring and fall; under horse-droppings; listed as a variety of the preceding, but is probably a good species.
- O. tuberculifrons** Harold. West Bergen (Bf); Jamesburg VII (Jl); Atco (Li); Clementon VIII (W); Brigantine Beach IX (Hn).
- O. pennsylvanicus** Harold. Common throughout the State.

PSAMMODIUS Heer.

- P. nanus** De G. Greenville, West Bergen IV, V (Bf); lives in chicken excrement and is cosmopolitan (Sz).

PLEUROPHORUS Muls.

- P. cæsus** Panz. G. d. rare (Bf); always at light (W).

RHYSEMUS Muls.

- R. scaber** Hald. Along the shore, Brigantine to Anglesea VI-IX; on the beach and in the marshes.

ATÆNIUS Harold.

- A. cognatus** Lec. Westville I, 28 (W); Brigantine (Hn); Beesley's Point VI, 30, Anglesea (GG).
- A. wenzeli** Horn. Brigantine IX (Hn); Atlantic Co., Anglesea (W); Cape May VI, 3 (Brn); mostly at light.
- A. strigatus** Horn. Westville V (GG); Brigantine Beach IX (Hn).
- A. gracilis** Mels. Irvington (Bf); Westville VIII, 1 (div); Woodbury VII, 30 (W); Gloucester V, 27, Sea Isle VI, 10 (Brn); Brigantine IX (Hn).
- A. imbricatus** Mels. G. d. (Bf); Atlantic City VI, 24, Anglesea VII, 11, under drift (W); Sea Isle V, VI (Brn).
- A. socialis** Horn. Atlantic City, rare (W).
- A. abditus** Hald. Collingswood VII, 27 (GG).

DIALYTES Harold.

- D. truncatus** Mels. Lake Hopatcong (Pm).

OXYOMUS Lap.

- O. sylvestris** Scop. (porcatus Fabr.) Snake Hill IV, 20 (Jl); Newark Dist. V (Bf); Staten Island (Lg); common in cow droppings.

APHODIUS III.

- A. fossor** Linn. Piedmont Plain and northward; an imported species, which is now common about Newark and in Hudson County.
- A. fimetarius** Linn. Common throughout the State.
- A. ruricola** Mels. Westville IV, 26, Atco (W); Atlantic City VI (GG).
- A. granarius** Linn. Throughout the State; common.
- A. vittatus** Say. Newark Dist. (Bf); DaCosta V, Anglesea VII (W); local and common throughout the State.
- A. inquinatus** Hbst. Common throughout the State.
- A. rubeolus** Beauv. Newark Dist. (Bf); Camden, Landisville (Li); Woodbury VII, DaCosta V, Clementon VIII (W).
- A. stercorosus** Mels. Throughout the State; usually common.
- A. bicolor** Say. Newark (Bf); Westville (Li).
- A. phalerioides** Horn. Sandy Hook to Cape May, along the coast VII-IX.
- A. femoralis** Say. Generally distributed, not rare (W, Li).
- A. oblongus** Say. Ft. Lee III, 24, in a rotten stump (Bt).
- A. parvus** Horn. Anglesea VII, 11, at light (W).

BOLBOCEROSOMA Schaef.

- B. farctum** Fab. Throughout the State; local and rare.

BOLBOCERAS Kirby.

- B. lazarus** Fab. Woodbury VII (div); Sea Isle VII, Brigantine VII (Brn); Anglesea VI, VII (div); never common.

ODONTÆUS Kl.

- O. filicornis** Say. Ocean Beach (Pr); Atlantic City (Li); Sea Isle VI (Brn).
- O. cornigerus** Mels. Spotswood (Jl); New Jersey (Li).

GEOTRUPES Latr.

- G. splendidus** Fab. Throughout the State; local, not common.
- G. semiopacus** Jek. Madison (Pr); Newark (Soc); Riverton X, 24 (GG); Atlantic City (Li); Anglesea VIII, 8 (W).
- G. egeriei** Germ. Shark River VII (GG); Camden (Li); Woodbury IV, 21, Clementon III, 18, under fungus (W).
- G. Blackburnii** Fab. Throughout the State III-X, common, in excrement.
- G. balyi** Jek. Ft. Lee (Sf); Lakehurst IX, 3, in underground stem of toadstools (Jl); Gloucester VIII, IX (W); Westville (Li).
- G. hornii** Blanch. Hopatcong, Highlands (Sf); Staten Island (Bt); Somer's Point (Hn); under or near decaying toadstools.

The record of "*G. inutilis*" Horn is an error.

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TROX Fab.

- T. scabrosus* Beauv. Throughout the State VI-IX; not rare. All the species in or under dried carcasses, hides, bones, etc.
- T. asper* Lec. Sandy Hook (Bt); Brigantine Beach IX (Hn).
- T. suberosus* Fab. Sandy Hook VII (Bt); Lahaway (Sm); Woodbury IX, Atlantic City (GG); Anglesea V, 31, g. d. (W).
- T. tuberculatus* De G. Caldwell (Cr); Newark, rare at light (div).
- T. erinaceus* Lec. Hudson Co. (Li); Staten Island II, 25, and later in owl pellets (Ds); Woodbury VI (W); g. d. (Li).
- T. capillaris* Say. Staten Island (Lg); Newark, at light, rare (Bf).
- T. unistriatus* Beauv. Throughout the State; not rare.
- T. sordidus* Lec. Madison (Pr); Staten Island IV (Ds); Westville (Li).
- T. insularis* Chev. (foveicollis Harr.) Newark (Bf); Staten Island VIII (Ds); g. d. rare (Li).
- T. terrestris* Say. Hudson Co. (Li); Staten Island VII (Ds).
- T. æqualis* Say. Staten Island (Lg).
- T. scaber* Linn. Throughout the State VI, VII; not common.
- T. atrox* Lec. New Jersey (Henshaw).

AMPHICOMA Latr.

- A. lupina* Lec. Hopatcong (Pm); Staten Island (Sf); Jamesburg VII (W); Sandy Hook (Loeffler); seashore (Li).
- A. vulpina* Hentz. Newark (Soc); Jamesburg VII, 4, one female (Li).

HOPLIA Ill.

- H. trifasciata* Say. Ft. Lee (Bt); Orange Mts. (GG); West Bergen (Bf); seashore (Li); g. d. (W); flies very early in April as soon as vegetation starts.
- H. trivialis* Harold. Paterson, Lakehurst (Jl); Gloucester, seashore (Li); Lucaston and g. d. (W); in IV and V, very local but not rare where it occurs.
- H. modesta* Hald. Throughout the State IV-VI; our most common species.
- H. equina* Lec. Staten Island (Lg).

DICHELONYCHA Kirby.

- D. elongata* Fab. Throughout the State V, VI; locally not rare.
- D. subvittata* Lec. Hopatcong (Pm).
- D. testacea* Kirby. Hewitt VI, 5, Spotswood (Jl); Orange Mts. (GG); Staten Island (Lg).
- D. fuscula* Lec. Gloucester (Li); Anglesea V (div).
- D. albicollis* Burm. Ft. Lee VI (Bt); Riverton VI, 6 (Castle); Burlington Co. (W); Westville (Li); Newtonville VI, 11 (Brn).

SERICA MacL.

- S. vespertina* Gyll. Throughout the State V, VI; common.
- S. iricolor* Say. Ft. Lee Dist. (Bt); Ocean Co., on scrub oak VI (Sm); DaCosta, Atco (Li); Atlantic Co. (W); local.
- S. sericea* Ill. Throughout the State V, VI; common.
- S. trocifformis* Burm. Ft. Lee Dist. (Bt); throughout the pine barrens all V and early VI, getting only a little into the Delaware Valley region.

MACRODACTYLUS Latr.

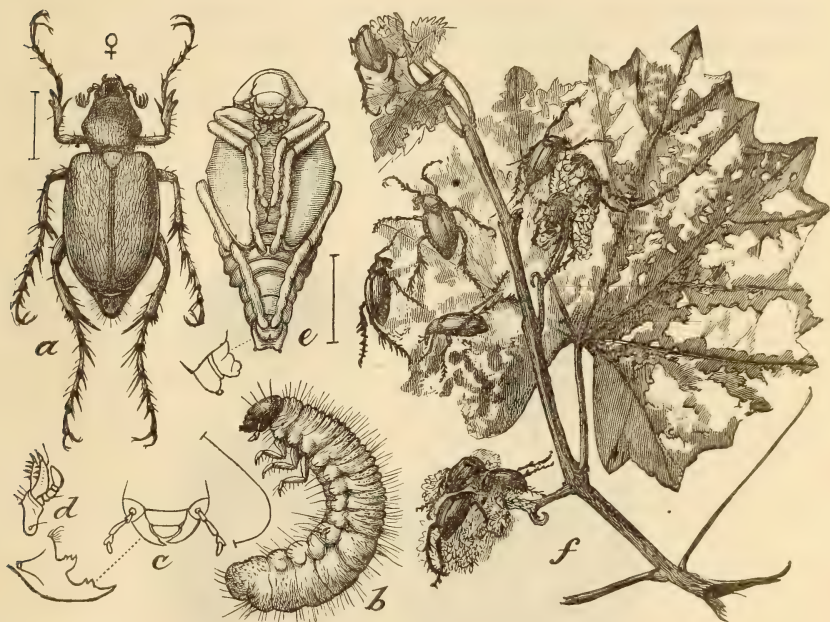


Fig. 126.—The “rose-bug,” *Macrodactylus subspinosus*: a, adult beetle; b, larva; c, pupa; c, d, structural details, all enlarged; f, grape leaf showing injury and beetles at work—natural size.

- M. subspinosus* Fab. The “Rose-bug” or “Rose chafer”; common throughout the State, often coming in such hordes as to destroy the blossoms of roses and other plants blooming in June, and in vineyards in some sections utterly destroying the grape crop by eating the blossoms. They also eat into a variety of fruits, including apples and do great mischief in that way. The larvæ feed on the roots of grasses and other vegetation in waste land and are beyond reach of destructive measures. Practically, spraying plants to be protected with heavy doses of arsenate of lead or collecting the adult beetles as they come on, by collectors adapted to the special work, are our only resorts.
- M. angustatus* Beauv. Jamesburg VII, 4 (Bt); Riverton V, 28 (GG); Anglesea VI, VII, on oak (div).

DIPLLOTAXIS Kirby.

- D. sordida* Say. West Bergen (Bf); Woodbury VII, 30, at light, Lucaston IV, 25, Anglesea V (W); Brigantine VII, Sea Isle VII (Brn).
D. atlantis Fall. Orange, Staten Island (Fall); some specimens of this species are undoubtedly in collections as "*sordida*."
D. tristis Kirby. Included by Fall in the list of New Jersey species; but I have no definite records. Mr. Wenzel has it from Arcola, Pa.
D. liberta Germ. Throughout the State V-VII; our most common species.
D. subcostata Blanch. DaCosta VI, 12 (Brn); Woodbury VI, 10 (W).
D. excavata Lec. Newark district (Bf); determined by Fall.
D. frondicola Say. New Jersey (Li, Fall).
D. bidentata Lec. Atco (Li, Fall); Anglesea, sweeping at night (W); this is the "*truncatula*" of last edition.
D. harperi Blanch. New Jersey (Fall); Snake Hill IV, 14, V, 1 (Harbeck); Newark district (Bf).

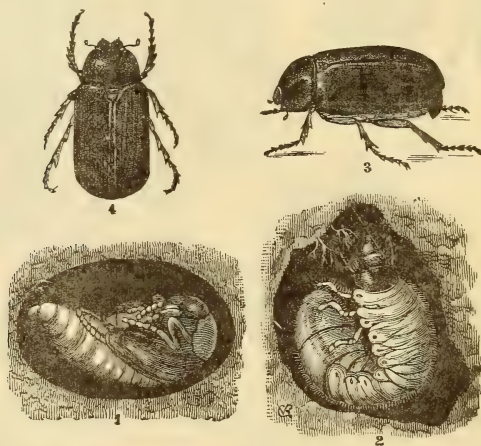


Fig. 127.—May beetle: 1, pupa in earthen cell; 2, larva or "white grub"; 3, adult from side; 4, same from top.

LACHNOSTERNA Hope.

These are the "May beetles" or "June bugs," the larvæ of which are the ordinary "white grubs" of pasture and garden land. Fall plowing and the use of chickens and hogs are the most available methods of control.

- L. glaberrima* Blanch. DaCosta VII, 19 (Dke); Brigantine IX, 10 (Hn); Anglesea VII (Sz).
L. ephilida Say. Newark Dist. (Bf); Orange, Highlands VI (Bt); g. d. (W, Li).
L. longitarsus Say. New Jersey (GG).

- L. clemens* Horn. New Jersey (U S N M).
- L. dispar* Burm. Camden, Gloucester Co. (W).
- L. gracilis* Burm. New Brunswick (Coll); Camden, Gloucester Co. (W); Laurel Springs VII, 21 (Dke); Sea Isle VII, 4 (Brn).
- L. gibbosa* Burm. Throughout the State; locally common.
- L. subpruinosa* Casey. Sure to occur in New Jersey.
- L. inversa* Horn. New Brunswick, Lakewood, Lahaway rare (Coll).
- L. micans* Knoch. Throughout the State, VI, VII; locally common.
- L. arcuata* Smith. Locally and seasonally throughout the State V-VII. The common species is not the same each year, in the same locality, and a species swarming at light one season may be totally absent the next.
- L. insperata* Smith. Snake Hill; rare.
- L. dubia* Smith. Throughout the State, locally and seasonally common.
- L. fusca* Fröehl. The commonest of all our species V-VII.
- L. grandis* Sm. Hopatcong (Pm); Jersey City (Coll); Camden, Gloucester Co (W); Forked River Mts. V, 26 (Dke).
- L. barda* Horn. New Jersey, two specimens (Sf).
- L. marginalis* Lec. Lake Hopatcong (Pm, Sf).
- L. fraterna* Harr. This, with its varieties "cognata" Burm., and "forsteri" Burm., is locally common throughout the State.
- L. nova* Smith. New Brunswick (Coll); and probably g. d., rare.
- L. luctuosa* Horn. Buena Vista, one specimen (Li).
- L. knochii* Sch. & Cyll. Riverton (Castle); in roads through pine woods, dead specimens only (W).
- L. rugosa* Mels. New Brunswick (Sm); Camden, Gloucester Co. (W); Merchantville III, 15 (Dke); probably g. d., local and rare.
- L. hirsuta* Knoch. Throughout the State V-VII; locally common.
- L. balia* Say. New Jersey, without definite locality.
- L. hirticula* Knoch. Common everywhere V-VIII.
- L. æmula* Horn. DaCosta VI, 4 (Dke).
- L. crenulata* Fröehl. Throughout the State; local, never very abundant.
- L. parvidens* Lec. Manumuskin VI, 23 (Dke).
- L. ilicis* Knoch. Throughout the State; not rarely.
- L. quercus* Knoch. Rare, isolated specimens from various localities.
- L. tristis* Fab. Throughout the State; our commonest small species.

PHYTALUS Er.

- P. georgianus* Horn. Hammonton VIII, 15, one specimen (Sz).

POLYPHYLLA Harr.

- P. variolosa* Hentz. Hopatcong (Pm); Highlands (Sf); Riverside, Westville VII, 9 (W), and all along shore in the wash-up VI-VII.

ANOMALA Kœppe.

- A. binotata** Gyll. Throughout the Delaware Valley, the pine barrens and maritime regions III-V, locally not rare.
- A. innuba** Fab. (*minuta* Burm.) Anglesea (div).
- A. undulata** Mels. Throughout the State IV, VI, locally not rare.
- A. lucicola** Fab. Throughout the State, common on grape and "Ampe-
lopsiis" VI, VII; the most abundant form of the genus, and quite variable.
- A. oblivia** Horn. Pine barrens V-VII, locally not rare; extending into the maritime and a little into the Delaware Valley region.
- A. marginata** Fabr. Plainfield VI, 20 (Sf); g. d., on hickory (W); sea-
shore (Li); locally not rare.

The record of "*lurida*" Fab. is an error, based on an abnormal form of "*binotata*."

STRIGODERMA Burm.

- S. pygmæa** Fab. Throughout South Jersey V-VII, locally common on sweet potato and other "Convolvulaceæ."
- S. arboricola** Fab. Throughout the State VI, VII, more common south-
wardly on flowers of "Rubus" and "Rosaceæ" generally. At Angle-
sea on "Opuntia."

PELIDNOTA MacL.

- P. punctata** Linn. Common throughout the State on grape; larva in hickory and oak stumps (Bt).

COTALPA Burm.

- C. lanigera** Linn. Throughout the State VI, VII, on wil-
low or poplar, occasionally on oak; never very abundant.

CYCLOCEPHALA Latr.

- C. immaculata** Oliv. Sandy Hook (Bt); Camden VI, 10,
Sea Isle VII, 4 (Brn); seashore (Li); g. d. (W).

DYSCINETUS Harold. (CHALEPUS MacL.)

- D. trachypygus** Burm. Throughout the State, but much more common along shore; attracted to light VIII, IX.

LIGYRUS Burm.

- L. gibbosus** De G. Common throughout the State, at light, VIII, IX; more abundant along shore.
- L. relictus** Say. As before, but much more abundant; so plentiful at times as to be a veritable nuisance.



Fig. 128.—
Cotalpa lanigera.

APHONUS Lec.

- A. castaneus** Mels. Madison (Pr); along shore VI, VII (div); not common; larva in decaying stumps.

XYLORYCTES Hope.

- X. satyrus** Fabr. Ft. Lee (Bt); Newark (Bf); throughout South Jersey VII, VII, never common; larva in roots of ash. Is known as the "Rhincerus beetle," because of the great horn on its head.

STRATÆGUS Hope.

- S. antæus** Fabr. Newark (Soc); Long Branch (Bt); throughout the pine barrens VII, VIII, extending rarely into the Delaware Valley region. Larva in rotting wood. The beetle is very stout and broad, with three thoracic processes, which are sometimes long and horn-like, giving rise to the local name "Ox-beetle."

DYNASTES Kirby.

- D. tityus** Linn. Wildwood (Satterthwaite); Cape May (W); one specimen each. This species is really southern, and its occurrence at that point on our coast is accidental.

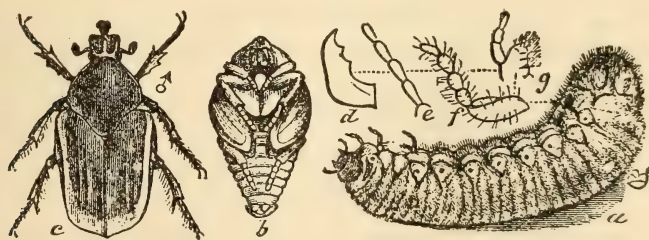


Fig. 129.—*Allorhina nitida*: a, larva; b, pupa; c, adult; d-g, larval details.

ALLORHINA Burm.

- A. nitida** Linn. Throughout the State; locally common in sandy districts; flies like a bumble bee on bright, hot days in July, occasionally in swarms; the larva is sometimes injurious in sod, eating off the roots so that the top can be rolled up like a carpet.

EUPHORIA Burm.

- E. areata** Fab. Throughout the State; very local and seasonal IV, V and IX; sometimes abundant.
- E. sepulchralis** Fab. Hopatcong (Pm); Del. Water Gap (Bt); throughout South Jersey in June (div); rare and local.

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- E. fulgida** Fab. Throughout the State V, VI; locally and seasonally not rare.
- E. herbacea** Oliv. Plainfield VII (Lv); Staten Island V (Bt); Westville (Li); Lahaway V, 28 (Sm); g. d. (W).
- E. inda** Linn. Throughout the State, spring and fall; beetles occasionally injurious to growing ears of corn, peaches and other fruits; larva not injurious, living in manure and rich earth (Ch).
- The locality for "melancholica" Gory. is so doubtful that Mr. Schwarz recommends dropping the name.

CREMASTOCHILUS Knoch.

- The species of this genus are associated with ants, living in their colonies, but hardly in friendly relations with them. They are not often found unless especially sought for, and may be in general accounted rare.
- C. variolosus** Kirby. Greenwood Lake, Ft. Lee (Bt); Madison (Pr); Orange Mts. (Bf); Gloucester Co. (div); Glassboro VII, 27 (GG).
- C. canaliculatus** Kirby. Paterson V (Gr); Woodside V, 1 (Bf).
- C. castaneæ** Knoch. Hewitt V, 20, VI, 15 (Jl).
- C. harrisii** Kirby. Hopatcong (Pm); Morristown (Ds); Woodbury (Li); Clementon V, 10, locally common on sandy flats (W).

OSMODERMA Lep.

- O. eremicola** Knoch. Throughout the State, locally not rare; the larva often abundant in rotting trees.
- O. scabra** Beauv. With the preceding, usually more common; larva as before.

GNORIMUS Lep.

- G. maculosus** Knoch. Greenwood Lake (Bt); Hewitt V, 29 (Jl); Ft. Lee (div); Staten Island (Lg); seashore (Li); g. d. (W).

TRICHIUS Fabr.

- T. piger** Fab. Throughout the State VII, on flowers; often in great numbers on roses; larvæ in old oak stumps (Jl).
- T. affinis** Gory. With the preceding; usually more common.
- T. bibens** Fab. Hewitt V, 30 (Jl); on flowers of "Viburnum pubescens" (Ds).
- T. delta** Forst. Williamstown, DaCosta VII, 4, 16 (W).

VALGUS Scriba.

- V. squamiger** Beauv. Common throughout the State IV-VI; the larvæ sometimes abundant in decaying stumps.

V. canaliculatus Fab. Hopatcong (Pm); Staten Island (Lg); Vineland (U S Ag); never in large numbers.

Family SPONDYLIDÆ.

Oblong, brown, somewhat flattened beetles, with rather short antennæ; the tarsi 5-jointed, the 4th short and the 3rd somewhat lobed. The thorax is almost square, the head horizontal and the mandibles are rather prominent.

PARANDRA Latr.

P. brunnea Fabr. Throughout the State, locally not rare V-VII; breeds in decaying deciduous and coniferous trees.

Family CERAMBYCIDÆ.

These are the "long-horned beetles," so called because the antennæ or feelers are as long or longer than the body. The body is usually more or less cylindrical, although many species are somewhat flattened. In all cases the thorax is without a sharp lateral margin or suture and carries out the idea of a cylinder, even if the form does not. The front is more or less obviously vertical, and the mandibles are usually stout and sharp-pointed. The tarsi are apparently four-jointed only, the third being deeply lobed.

The larvæ are borers, generally in woody tissue, although a few bore into herbaceous plants. They are more or less cylindrical, the joints well marked, those of the thorax enlarged, the head chitinous, with powerful mandibles. They resemble the larvæ of the "Buprestidæ" in a general way, but are not flattened, especially toward the head, so they are called "round-headed" borers.

Most of the species live in the solid or heart wood of dead or dying trees; but some of them work in the sap-wood or under bark, and not a few attack healthy, sound trees, paving the way for other species that prefer less vitality.

Only a few species are economically important in New Jersey, and these are usually dealt with by mechanical barriers or other direct means.

ORTHOSOMA Serv.

O. brunneum Forst. Throughout the State in July, not rare; larvæ in oak stumps and logs.

TRAGOSOMA Serv.

T. harrisii Lec. Newark, rare (Bf); along shore in wash-up, occasional.

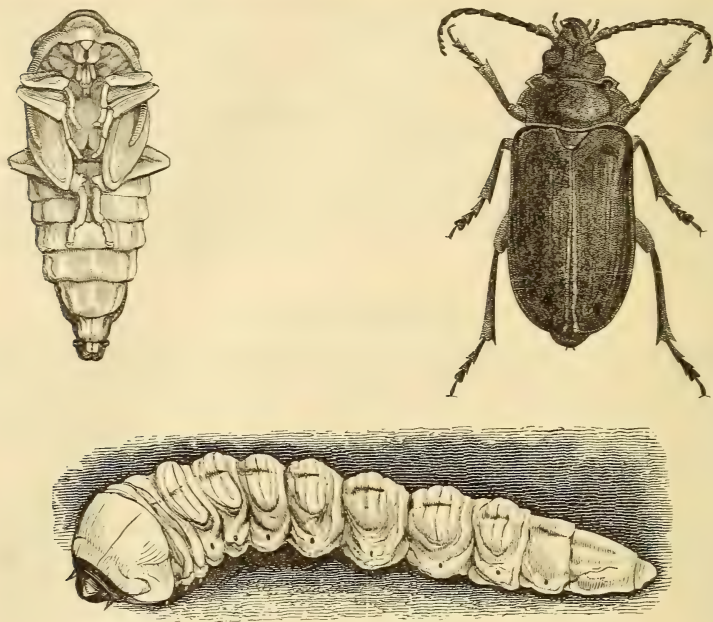


Fig. 130.—*Prionus laticollis*, larva, pupa and adult.

PRIONUS Geoff.

- P. laticollis* Dru. Throughout the State, July and August. The larva lives in the roots of many trees and shrubs, including orchard trees and small fruits. On grape and blackberry it is sometimes injurious, causing less damage to the former than the latter. The larva requires three years to reach its full growth; and when it works in the crown of the blackberry causes so much injury that the removal of the affected portion and the destruction of the borer is the only remedy.
- P. pocularis* Dalm. Throughout the pine barrens in July and August; the larva often common in decaying pine logs.

SPHENOSTETHUS Hald.

- S. taslei* Buq. Snake Hill, coll. Bkln. Inst. Mus. (Sf); "New Jersey" (Horn); rare in New Jersey (Li). There are no recent records.

ASEMUM Esch.

- A. moestum* Hald. Throughout the State, May and June; the larva on pine.

CRIOCEPHALUS Muls.

- C. agrestis* Kirby. Chester (Dn); Newark (div); Brigantine Beach IX (Hn); Lahaway VII, Anglesea (Coll).

- C. obsoletus** Rand. Newark (Bf); Woodbury, Atlantic City (W); Sea Isle VII (Brn).

SMODICUM Hald.

- S. cucujiforme** Say. Short Hills VII (Bt); Orange, not rare at light (Ch); Newark (Bf); Camden, Gloucester Co., under oak bark (W); Collingswood, Glassboro VII (GG); Lahaway VI (Sm); g. d. (Li).

PHYSOCNEMUM Hald.

- P. brevilineum** Say. Ft. Lee VII (Sf); Weehawken VI (Bt); Orange Mts. (Bf); seashore, Atlantic City to Cape May VI, VII (div); feeds on elm.

HYLOTRUPES Serv.

- H. bajulus** Linn. Throughout the State in June, on pine.
H. ligneus Fabr. Throughout the State on cedar; begins to emerge as early as March and continues until late June.

PHYMATODES Muls.

- P. variabilis** Fabr. Throughout the State on oak, VI, VII; the larva is one of the "bark slippers" often found in great numbers on cord wood.
P. infuscatus Lec. Staten Island (Lg).
P. lengi Joutel. Fort Lee in May; type locality (Jl).
P. lividus Rossi. An introduced species, found in Staten Island and New Jersey (Jl).
P. amœnus Say. Throughout the State IV, V, the larva breeding in dead grape stems; locally not rare.
P. ater Lec. Anglesea V, on oak (W); Sea Isle V, 29 (Brn).
P. dimidiatus Kirby. Staten Island (Lg); Long Branch (Bf).
P. varius Say. Not uncommon throughout the State, V, VI; the larva, with that of "variabilis," in oak; I have bred both species from one stick.

The record of "*P. blandus*" in last edition was based on a misidentification.

MERIUM Kirby.

- M. proteus** Kirby. Newfoundland, 1 example collected by Leng (Jl). This is essentially a boreal species; but the record of its capture by Mr. Leng is clear in all details. The example was taken alive on a log near a local sawmill, the log cut in the nearby woods.

CALLIDIUM Fabr.

- C. antennatum** Newm. Throughout the State IV-VIII on pine and cedar; usually common and most abundant in May.
C. janthinum Lec. South Amboy IV, on pine boughs (Ds); Irvington on cut cedar IV (Bf); it is possible that both of these records may eventually prove to refer to the preceding; but the determinations seem correct.

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C. æreum Newn. Clifton V, 30, bred from chestnut (Ch); Orange Mts., Newark, at light (Bf); New Brunswick (Sm).

OEME Newn.

O. rigida Say. Throughout the State VI, VII, not common; breeds in cedar and is sometimes found in the wash-up along shore.

O. gracilis Lec. * Orange VI (Ch).

CHION Newn.

C. cinctus Dru. Throughout the State V, VI, not common; the larva in hickory, oak and plum (Ch).

EBURIA Serv.

E. 4-geminata Say. Throughout the State VII, rarely; on oak and hickory (W).

ROMALEUM White.

R. simplicicollis Hald. Lahaway (Sm); Atlantic County in pine woods VIII, IX (W); not rare in wash-up along shore VIII (div).

R. atomarium Dru. DaCosta (Li); Bridgeton (GG); along shore in wash-up, under bark and at sugar VI, VIII, IX (div).

R. rufulum Hald. Hudson Co. (Li); Newark Dist. (Bf); Camden, Gloucester Co. IV, VII, VIII on oak (W); Glassboro VIII, 17 (GG).

ELAPHIDON Serv.

E. mucronatum Fab. Throughout the State on trees of various kinds; also on grape; does not amputate twigs like "*E. villosum*."

E. incertum Newn. Orange Mts., rare (Bf).

E. villosum Fab. (*parallelum* Newn.) Throughout the State IV-VII, more or less common. The larva is the common "oak-pruner"; but attacks also hickory, apple and other trees. It develops in the heart of a small shoot, and when full grown, girdles the shoot from within, so that it falls in the first high wind. Gather these fallen branches and burn them where shade or orchard trees are infested.

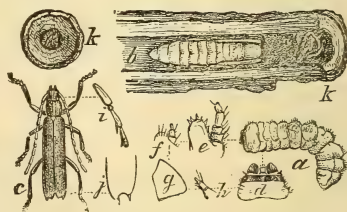


Fig. 131.—The "oak pruner": a, larva; b, pupa in its burrow; c, beetle; k, k, cut ends of twig; d to i, structural details.

E. subpubescens Lec. East Plains VII, 27 (Lg); g. d. rare (Li).

E. aculeatum Lec. Brown's Mills VIII, 4 (Dke); g. d. rare (W).

E. unicolor Rand. Short Hills (Bt); Woodside (Bf); Westville (Li); Berlin VI, 25, Woodbury VII, 30, Anglesea VII, common on scrub oak (W); bred from red-bud (Lec) and plum (Ch).

- E. cinerascens* Lec. Chester (Dn); Ft. Lee (Jl); Woodbury VII, 7 (GG); Lucaston VI, 14 (Dke).

The records for "inermis" and "pumilum" rest upon misidentification.

TYLONOTUS Hald.

- T. bimaculatus* Hald. Ft. Lee VII, 26 (Jl); Newark, New Brunswick (Sm); Westville (Li); Camden, Gloucester Co., under bark of ash (W).

HETERACHTHES Newn.

- H. 4-maculatus* Newn. Palisades VI (Lv); Ft. Lee (Bt); Hudson Co. (Li); Orange Mts. (Bf); Gloucester, Camden Co., g. d. (div); on hickory.
- H. ebenus* Newn. Boonton VII, 15 (GG); Ft. Lee (Bt); Newark at light (Bf); New Brunswick VI (Sm); Camden, Gloucester Co., VI, VII (div); along shore Atlantic City to Cape May in wash-up (div).

CURIUS Newn.

- C. dentatus* Newn. Anglesea, rare, on oak (W).

OBRIUM Serv.

- O. rufulum* Gahan. (*rubrum* Newn.) Ft. Lee (Sf); Orange VI (Ch), Newark on oak (Bf); Woodbury VIII, 7 on ash (W).
- O. rubidum* Lec. Orange Mts., on ash (Bf); Philadelphia Neck (W).

PHYTON Newn.

- P. pallidum* Say. Ft. Lee, Highland VII (Sf); Orange Mts. VII (Bf); Rocky Hill VI (Coll); Woodbury VII (GG); Camden VII, Anglesea (W); breeds in hickory and red-bud (Ch).

MOLORCHUS Fab.

- M. bimaculatus* Say. Palisades (Lv); Newark Dist. (Bf); Orange Mts. VII, Riverton V (GG); Clementon V, Woodbury VI (W); Brown's Mills V (Dke); Anglesea V, 30; Lahaway V (Sm); develops in dead ash, dog-wood, red-bud, hickory, walnut and maple (Ch).

RHOPALOPHORA Serv.

- R. longipes* Say. Seashore (Li); breeds in red-bud (Ch).

TRAGIDION Serv.

- T. coquus* Lec. Caldwell (Cr); Malaga VIII, IX (GG); Lakehurst VII, IX, on oak (div); Lahaway IX, Cumberland Co., Mt. Holly VIII, Lucaston IX (Dke); g. d., more common southwardly (W); in wash-up along shore (div).
- T. fulvipenne* Say. Several specimens, in June, near Westville (Bland).

PURPURICENUS Serv.

- P. humeralis** Fab. Ft. Lee, on oak VI (Bt); Newark Dist. (Bf); Camden VII, DaCosta VI (W); Merchantville VI (Dke); common in wash-up along shore, Sandy Hook to Cape May.
- P. axillaris** Hald. Ft. Lee (Sf); DaCosta VII, 3, on oak (W); several in different localities (Li); always rare.

BATYLE Thom.

- B. suturalis** Say. Throughout the State VII and VIII.

STENOSPHEENUS Hald.

- S. notatus** Oliv. Throughout the State, but local; breeds in hickory.

CYLLENE Newm.

- C. caryæ** Gahan. (*picta* Dru.) Throughout the State IV-VI; breeds in hickory and is sometimes injurious in shade trees.
- C. robinia** Forst. Throughout the State VIII-X; breeds in locust, making it practically impossible to raise decent trees in most localities.

PLAGIONOTUS Muls.

- P. speciosus** Say. Madison (Pr); Orange Mts. (Bf); top of Palisades at Ft. Lee (Jl); Snake Hill on oak (Li); breeds in sugar maples, and is often injurious.

CALLOIDES Lec.

- C. nobilis** Say. Local throughout the State VI; on oak stumps (Bt); sometimes common in wash-up all along shore.



Fig. 132.—*Plagionotus speciosus*.

ARHOPALUS Serv.

- A. fulminans** Fabr. Throughout the State VI, VII, sometimes not uncommon; breeds in chestnut (Ch).

XYLOTRECHUS Chev.

- X. colonus** Fab. Common throughout the State V-VIII; lives in oak, maple, hickory, chestnut and other trees.
- X. sagittatus** Germ. Lakehurst, common in dead pine IX (div); Anglesea VII, 25, in the wash-up, g. d., rare (W).
- X. 4-maculatus** Hald. Ft. Lee VI, 18 (Jl); Irvington (Bf); Staten Island (Sf); Jamesburg (div); So. Camden on black alder (W); Brigantine Beach IX (Hn).

- X. undulatus** Say. Orange Mts. (Bf); Palisades, Lakehurst VIII, 2 (Jl); the variety "lunulatus" Kirby has also been taken in the Orange Mts.; breeds in spruce and hemlock (Ch).
X. nitidus Horn. Gloucester County, one specimen (Bland).

NEOCLYTUS Thom.

- N. scutellaris** Oliv. Spring Lake VIII (Ch); g. d. (W); Malaga VIII, 4 (CG); Lakehurst (Ds).
N. jouteli Davis. Rahway VIII, 2 (Bf Gr); Lakehurst VII (Bf Ds).
N. luscus Fab. Generally distributed; rare (W).
N. conjunctus Lec. Palisades, bred (Jl).
N. capræ Say. Boonton IV, 28, common on freshly cut chestnut (GG); Newfoundland on wood piles VII, 5 (Sf); Newark (Soc); g. d., rare (W); breeds in ash, elm and hickory (Ch).
N. erythrocephalus Fabr. Throughout the State V-VII; breeds in forest, shade and fruit trees in great variety, and also in grape canes (Ch).

CLYTANTHUS Thom.

- C. ruricola** Oliv. Hopatcong (Pm); Newfoundland VII (Ds); Palisades, on dead oak (Lv); Orange Mts. (Bf); Clementon V, 24 (GG).
C. albofasciatus Lap. Palisades, on dead oak (Lv); Ft. Lee (Jl); Camden VI, VII (div).

MICROCLYTUS Lec.

- M. gazellula** Hald. Newark (Bf); South Jersey, rare (W).

CYRTOPHORUS Lec.

- C. verrucosus** Oliv. Throughout the State; not rare; lives on chestnut, beech, linden and a variety of other trees (Ch).

TILLOMORPHA Blanch.

- T. geminata** Hald. Throughout North Jersey V-VII (div); South Jersey (W); bred from sumac (Ulke).

EUDERCES Lec.

- E. picipes** Fab. Throughout the State VI, VII; lives on linden, beech, chestnut, etc., (Ch).
E. pini Oliv. Caldwell (Cr); Newark (Bf); on scrub oak, near Timber Creek VI, rare (Bland).

ATIMIA Hald.

- A. confusa** Say. Pleasant Mills (Say); Eagle Rock, all summer, on cut cedar (Bf); Atco (Li); g. d., rare, in Juniper (W); Anglesea V, 31 (Brn).

DISTENIA Serv.

- D. undata** Oliv. Ft. Lee (Bt); Hudson Co. (Li); Orange Mts., on hickory VII (Bf); Westville (Li); Anglesea VII, 22 (Sm).

DESMOCERUS Serv.

- D. palliatus** Forst. Throughout the State on elder in July; seems to be absent from Staten Island; no records coming thence.

ENCYCLOPS Newn.

- E. cœruleus** Say. Hewitt VI, 2, on flowers of dogwood (Jl); Orange Mts.; sometimes common near Newark (Bf); Gloucester (Li).

RHAGIUM Fabr.

- R. lineatum** Oliv. Throughout the State on pine III-VII; larva under pine bark.

CENTRODERA Lec.

- C. decolorata** Harr. "New Jersey" (Sm).
C. picta Hald. Chester (Dn); Ft. Lee (Sf); Orange Mts., Woodside V, 3, rare on dry hickory (Bf); DaCosta, Anglesea (W).

TOXOTUS Serv.

- T. vittiger** Rand. Ramapo, N. Y. (Jl); just across the New Jersey line, and doubtless occurs also on our side of the fence.
T. cylindricollis Say. Ft. Lee VI, 23 (Jl); "New Jersey" (Horn).

ACMÆOPS Lec.

- A. thoracica** Hald. Ramapo, N. Y., V, 31, in some numbers, just north of the line (Ds); certain to occur also in New Jersey.
A. bivittata Say. Fort Lee VI (Bt); Newark (Soc); g. d. (Li).
A. directa Newn. Del. Water Gap VII, 12 (Jn); Hopatcong (Pm); Greenwood Lake, Ft. Lee (Sf); Orange Mts. (Bf); Riverton (GG); Westville (Li).
A. discoidea Hald. Throughout the State, V, VI, local and not common.

GAUROTUS Lec.

- G. cyanipennis** Say. Throughout the Appalachian and Highlands regions, not rare VI; marked g. d. (W, Li); but local and not common.

STRANGALIA Serv.

- S. famelica** Newn. Throughout the State, VII, on flowers.
S. acuminata Oliv. Hopatcong (Pm); Hewitt VI, 18, common on flowers (Ds); Orange Mts. (div); Newark (Soc); Riverton V-VII (GG); Westville (Li); Brown's Mills I, 27 (Dke).
S. luteicornis Fabr. Common throughout the State, on flowers VI, VII.
S. bicolor Swed. Throughout the State VI, VII, local and not common.

BELLAMIRA Lec.

- B. scalaris** Say. "Point Breeze," the type locality. Newfoundland VII, 5, in dead ash (Jl, Ds); Ft. Lee VI, 14, larvæ and pupæ in ash (Jl); Manumuskin VI, 21 (Dke).

TYPOCERUS Lec.

- T. zebratus** Fab. Sea Girt VIII (Bf); Landisville (Li); DaCosta (W); Atco VI (div); Laurel Springs V, 23 (Dke); Lahaway V, VI (Sm).
T. velutinus Oliv. Common throughout the State on flowers in July.
T. lugubris Say. Fort Lee VI (div); "New Jersey" (Hw).

LEPTURA Serv.

- L. emarginate** Fab. Boonton VIII, 5, ♀ ovipositing (GG); Palisades in dead oak and maple (Lv); Ft. Lee, larva in any decayed wood, lives three years (Jl); Irvington VII (Bf); Gloucester VII, 10 (GG).
L. deleta Lec. "New Jersey" (Li).
L. plebeja Rand. Caldwell (Cr); "New Jersey" (Horn).
L. subhamata Rand. Newfoundland VII, 4 (Jl); "New Jersey" (Lg).
L. abdominalis Hald. Atlantic City (Castle) seashore, one ♀ (Li).
L. lineola Say. Throughout the State in June; locally common.
L. cruentata Hald. Hewitt VI, 2 (Jl); DaCosta 1 dead specimen (Li).
L. americana Hald. Ft. Lee, Hewitt VI, 18-25 (Jl); Eagle Rock, V (Bf).
L. nana Newn. var. *hæmatites* Newn. Ft. Lee (Sf); Orange Mts., on dog-wood blossoms (Bf); Westville (Li).
L. nitens Forst. Throughout the State, V, VI, on chestnut, oak and beech.
L. cordifera Oliv. Del. Water Gap VII, 12 (Jn); Hopatcong (Pm); Orange Mts., once common (Bf).
L. rubrica Say. Throughout the State V-VII; on dead beech (Lv).
L. circumdata Oliv. Hewitt VI, 25 (Jl); Hopatcong (Pm); Orange Mts., on pussy willow (Bf); Atco (Li); Clementon VI, 3 (Jn); Lahaway VI on magnolia flowers (Sm); Anglesea V, 28 (W).
L. vagans Oliv. Del. Water Gap VII (Jn); Hewitt VI, Lakehurst VI (Jl); Sea Girt VIII (Bf); Clementon VI (GG); Atco, DaCosta VI, Anglesea (W); bred from butternut, hickory and birch (Ch).
L. proxima Say. Del. Water Gap VII, 14 (Jn); Hopatcong VI (Bt); Hewitt VI, 18 (Jl); Newfoundland VI (Ds); Palisades VI, 5 (Dke); Westville (Li).
L. octonotata Say. Hewitt VI (div); Hopatcong VI, Ft. Lee (Bt); Orange Mts. (Bf); Staten Island VI (Ds).
L. vittata Germ. Throughout the State VI, VII, on flowers; more abundant in the northern sections.
L. pubera Say. Del. Water Gap VII (Coll); Hewitt VI, 18, Ft. Lee V, 24 (Jl); Madison VI, 6 (Pr); Orange Mts. VI, VII, on "Spiræa" (Bf).

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- L. mutabilis* Newn. Palisades IV, V, larvæ in dead iron-wood (Jl); Orange Mts. (Bf); Staten Island (Lg).
L. quadricollis Lec. Staten Island (Lg).

CYRTINUS Lec.

- C. pygmæus* Hald. Throughout the State, locally common, V, VI; lives on oak, hickory, locust and box elder (Ch).

PSENOCERUS Lec.

- P. supernotatus* Say. Throughout the State V, VI, breeding in currant stems; locally common but rarely injurious.



MONOHAMMUS Serv.

- M. titillator* Fab. Throughout the State on pine, VI, VII; often common in the wash-up along shore; a small form at Anglesea.
M. scutellatus Say. Chester (Dn); Newark (Bf).
M. notatus Dru. (*confusor* Kirby) Ft. Lee (Bt); Eagle Rock VII, 5 (GG); Newark, Orange Mts. (Bf); Camden (Li); Atlantic, Cape May Cos., not rare (W).

Fig. 133.—*Psenocerus supernotatus*; currant tip borer.

DORCASHEMA Lec.

- D. alternatum* Say. Staten Island VI–VIII, common on Osage Orange and Mulberry (Ds); Camden, Merchantville VI, 7, on Mulberry (W); g. d. (Li).
D. nigrum Say. Hopatcong (Pm); Madison VII, 24 (Pr); Orange Mts. VII (Bf); Caldwell (Cr); Westville (Li); g. d. on hickory (W).
D. wildii Uhler. Common on Osage Orange near Philadelphia and kills all the black mulberry near that city; not yet found in New Jersey.

HETÆMIS Hald.

- H. cinerea* Oliv. Hewitt VI, 18, bred from hickory (Jl); Plainfield VII, 4 (Ds); Orange Mts. VII, on Mulberry (Bf); Newark (GG); Collingswood VI, 7 (W); g. d. (Li).

CACOPLIA Lec.

- C. pullata* Hald. Madison VII, 19 (Pr); Ft. Lee VI (Bt); Lakehurst VI, VII on scrub-oak (div); Gloucester, Atlantic Cos., on oak (W); Anglesea VII, 12 (Coll).

GOES Lec.

- G. tigrina* DeG. Hopatcong (Pm); Ft. Lee (Bt); Snake Hill (Sf); Caldwell (Cr); New Brunswick VIII (Coll); on oak in July (W); Glassboro VII, 27, under pine tree (GG).
G. pulchra Hald. Throughout the State VI, VII; not rare; on hickory.

- G. debilis** Lec. Greenwood Lake (Sf); Madison VIII, 12 (Pr); Orange Mts. (Bf); Ft. Lee (Bt); Merchantville VI, VII, on oak (W); DaCosta (Li); Lakehurst VII (div).
- G. tessellata** Hald. Orange Mts. VII (Bf); Ft. Lee (Sf); DaCosta, Atco VII, 13, on oak (W); Lahaway, larvæ at base of oak saplings in June (Sm); Lakehurst VII, 5 (Bf).
- G. pulverulentus** Hald. Montclair VII, on oak, iron-wood, hornbeam (Sf); Orange Mts. VII (Bf); Ft. Lee VI, VII, larva in iron-wood (G); New Brunswick VII (Sm); Camden (Li); Gloucester, Atlantic Co. VI, VII, on beech (W); Lakehurst V-VII, larva in scrub oak (div).
- G. oculata** Lec. Newfoundland VII, 6 (Watson).

ACANTHODERES Serv.

- A. quadrigibbus** Say. Hopatcong (Pm); Chester (Dn); Orange Mts. VIII (Bf); Caldwell (Cr); Ft. Lee (Jl); breeds in a variety of forest trees (Ch).
- A. decipiens** Hald. Chester (Dn); Palisades, on dead hickory V (Lv); Ft. Lee, So. Orange (Sf); Eagle Rock VII, 5 (GG); Gloucester, Camden Co. (W); Anglesea VII (Coll).

LEPTOSTYLUS Lec.

- L. aculiferus** Say. Orange Mts. I, at base of hickory; Newark VII, on tulip tree (Bf); Madison VIII (Pr); Woodbury VII, g. d. (W); sea-shore (Li).
- L. parvus** Lec. Hemlock Falls VII, 6, Eagle Rock VII, 9, Camden VII (GG).
- L. sexguttulus** Say. (*commixtus* Hald.) Lakehurst VII, 4 (Bf); along shore, Atlantic City to Anglesea VI, VII (div); reared from "Pinus inops" (Ch).
- L. biustus** Lec. Orange Mts. (Bf); Anglesea VII (Sz).
- L. collaris** Hald. Hopatcong (Pm); Highlands on chestnut (Ch); Hudson Co. (Li); Paterson V (Bf).
- L. macula** Say. Hopatcong (Pm); Chester (Dn); Caldwell (Cr); Orange Mts. (Bf); Clifton VII, breeds in many kinds of deciduous trees (Ch); Newark, Jamesburg VII, 4 (Coll); g. d. (W, Li).

LIOPUS Serv.

- L. crassulus** Lec. Madison (Pr).
- L. variegatus** Hald. Highlands, bred from huckleberry and box-elder (Ch); Palisades VI (Lv); Newark, Eagle Rock on locust, Sea Girt (Bf); Atco (Li); Sea Isle VII, 4 (Brn); g. d. (W).
- L. fascicularis** Harr. Newark (Soc).
- L. alpha** Say. (*cinereus* Lec.) Throughout the State VI-VIII, more or less common on sumac, in which it breeds.
- L. punctatus** Lec. Hopatcong (Pm); Eagle Rock VI, 26 (Bf); reared from dog-wood, "C. florida" (Ch), and also infests plum (Hopkins).

DECTES Lec.

- D. spinosus** Say. Throughout the State all season; occurs on and breeds in the stems of rag-weeds.

LEPTURGES Bates.

- L. symmetricus** Hald. Palisades VII, 2 (Lv); Ft. Lee (Sf); Hudson Co. (Li); g. d. (Bf); Ocean Co. V (Coll); bred from hackberry (Ch).
 var. **angulatus** Lec. Ft. Lee (Sf); g. d., not common (W, Li).
 var. **pictus** Lec. Orange Mountains (GG).
L. signatus Lec. Palisades VII (Lv); Ft. Lee (Sf); Caldwell (Cr); Newark Dist., g. d. (Bf); infests red-bud (Ch) and beech (Hpk).
L. quercus Fitch. Throughout the State VI-VIII, more or less common; breeds in oak, hickory and red-bud.
L. facetus Say. Throughout the State, with the preceding; the two possibly only forms of one species.

HYPERPLATYS Hald.

- H. aspersus** Say. (*maculatus* Hald.) Throughout the State, more or less common, V-VII, on oak.
 var. **nigrellus** Hald. Staten Island (Lg); Brown's Mills V (Dke).

GRAPHISURUS Kirby.

- G. fasciatus** DeG. Throughout the State V-VIII, not uncommonly; reared from chestnut, oak and maple (Ch).

ACANTHOCINUS Steph.

- A. pusilius** Kirby. Newark (Bf); New York City (Sf); from Dietz Coll., rare; under bark of "Pinus inops" (Ch).
A. obsoletus Oliv. Atlantic City (GG); Sea Isle VI, 11, Anglesea VI, 26 (Brn); g. d., but very rare; breeds in pine (Ch).
A. nodosus Fab. Egg Harbor IX, Anglesea (W), very rare; breeds in pine (Ch).

POGONOCHERUS Latr.

- P. mixtus** Hald. Hopatcong (Bt); Newark Dist., on dead swamp willow, Lakehurst VII, 4 (Bf); Atlantic City VI (div); Newtonville VI, Sea Isle VI (Brn); Anglesea VI (W); seashore (Li). The record for "*penicellatus*" Lec. was based on a misidentification.

ECYRUS Lec.

- E. dasycerus** Say. Throughout the State VI, VII; found on oak (Sf); breeds in red-bud (Ch), and hickory (LeConte).

EUPOGONIUS Lec.

- E. tomentosus** Hald. Throughout the State VI-IX; bred from apple twigs, but not commonly, and does no injury.

- E. subarmatus** Lec. Nyack on linden, and surely in New Jersey (Lg).
E. vestitus Say. Throughout the State, rarely; infests "*Cornus florida*" (Ch); hickory (Riley) and walnut (Hopkins).

ONCIDERES Serv.

- O. cingulatus** Say. Throughout the State VI-IX, but rare and local; girdles twigs of oak, hickory, persimmon, apple and other trees.

HIPPOPSIS Serv.

- H. lemniscata** Fabr. Madison VI (Pr); Bloomfield VIII (Bf); Camden VII, Merchantville VI (W); Westville (Li); Lahaway VII (Coll); Anglesea VII, 4 (Lv).

SAPERDA Fab.

- S. obliqua** Say. Throughout the State, rarely; breeds in black alder.
S. calcarata Say. Occasional throughout the State, the larva in trunks of poplar and cottonwood, attacking live trees.
S. mutica Say. Caldwell (Cr); Gloucester on willow (W).



Fig. 134.—Round-headed apple-borer, *Saperda candida*: a, larva; b, pupa; c, adult.

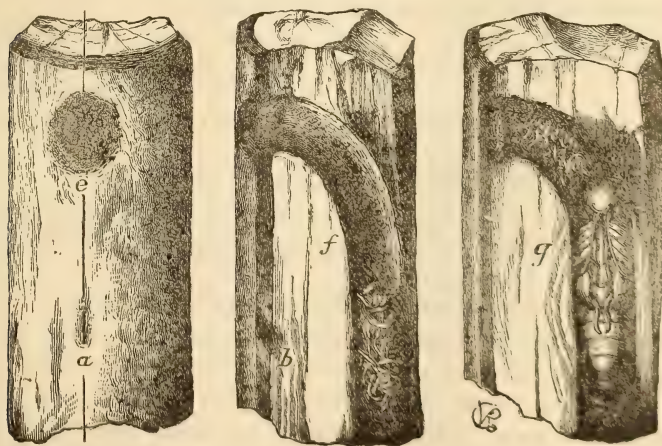


Fig. 135.—*Saperda candida*: a, puncture in which egg is laid; b, same in section; c, hole from which beetle has emerged; f, same in section; g, pupa in its cell.

- S. candida* Fabr. Throughout the State, late May to August, locally common. The larva is the "round-headed apple borer," which sometimes does great injury in apple orchards, though it is even more destructive in quince, and breeds also in "*Crataegus*" and "*Amelanchier*." The larva can be cut out when first noticed or reached with a soft wire in the later stages; but the best practice is to protect the base of the tree with some mechanical covering that will prevent the parent beetle from laying eggs or the young from getting into the trunk. Wire netting, paper, and other coverings serve the first purpose; whitewash, cement, soap mixtures and similar compounds the second.
- S. fayi* Bland. Del. Water Gap, Greenwood Lake (Bt); larvæ live in galls in stems of "*Crataegus*" (Jl).
- S. vestita* Say. Throughout the State in July; larva bores in base of trunk and exposed roots of linden (Jl) and often causes serious injury.
- S. discoidea* Fab. Throughout the State, locally not rare on hickory, on which the larva feeds; adult until IX, 1 (Ds).
- S. tridentata* Oliv. Boonton VI, VII (GG); Palisades IV (Lv); Ft. Lee, Weehawken VI (Bt); Caldwell (Cr); Newark Dist. (Bf); larva in standing and recently felled elm.
- S. imitans* Joutel. Palisades, Ft. Lee (Joutel).
- S. lateralis* Fabr. Throughout the State V, VI; larva in hickory.
var. *connecta* Joutel. Top of Palisades, in base of hickory (Jl).
- S. puncticollis* Say. Throughout the State, very rare, VI; the larva in stems of "*Ampelopsis quinquefolia*"; not in "*Rhus*" (Jl).
- S. concolor* Lec. Hewitt, Palisades, Ft. Lee, makes galls in poplar and willow stems (Jl); Newark Dist., wherever swamp willow occurs (Bf).
- "*S. moesta*" Lec. is based on a misidentification.

OBERA Muls.

- O. bimaculata* Oliv. Hopatcong (Pm); Hudson Co. (Ll); taken only on "*Rubus*" (Ch); Westfield VII, 9 (Bno).
var. *tripunctata* Fab. Throughout the State; not rare.
var. *basalis* Lec. Chester, Orange Mts., Irvington, rare (Bf); Merchantville VI, DaCosta VI (Brn); Laurel Springs V, 23 (Dke).
- O. schaumii* Lec. Newark (Soc.)
- O. ocellata* Hald. Throughout the State in July.
var. *discoidea* Lec. DaCosta VII, 5, Iona VI, 22 (Brn).
- O. tripunctata* Swed. Throughout the State V-VII.
var. *myops* Hald. Orange Mts., Newark (div); Anglesea (W).
var. *mandarina* Fabr. Hopatcong (Pm); So. Jersey (W); on "*Cornus alternifolia*," and said by Riley to breed in poplar (Ch).

O. gracilis Fab. Jamesburg VII (div); Lakehurst (Jl); DaCosta VII (div); Manumuskin VI, Brown's Mills VIII (Dke); Atco, Anglesea (W).

O. ruficollis Fab. Throughout the State VI, VII, on sumac and sassafras.

TETROPS Steph.

T. canescens Lec. Gloucester County, one specimen on alder (W).

TETRAOPES Serv.

T. canteriator Drap. Throughout the State; local; on milkweed.

T. tetraophthalmus Forst. Common everywhere VII-IX, on milkweed. One of the commonest species of the family.

AMPHIONYCHA Lec.

A. flammata Newn. Orange Mts., rare (Bf); "New Jersey" (Lg).

DYSPHAGA Lec.

D. tenuipes Hald. Westville, two specimens (W); bred from red-bud (Ch), and recorded also from hickory and walnut.

Family CHRYSOMELIDÆ.

These are the "leaf-beetles," having the same tarsal structure as in the "Cerambycidæ"; but with antennæ rarely as long as the body, the joints comparatively stouter and larger toward the tip. The species are rarely cylindrical and the thorax has usually either a lateral margin or a distinct suture.

The larvæ are "slugs" or "grubs," often stout and chunky like those of the potato beetle and feeding on leaves, or they may be long and slender, mining in root or leaf tissue. They vary much in habit, although always feeders on vegetable tissue, and many of them rank among the first-class pests. As against those that feed openly, the arsenites are usually available; but there are some that must be dealt with in other ways, depending on their habits.

DONACIA Fabr.

D. harrisii Lec. Newfoundland in a damp meadow (Lg).

D. floridæ Leng. Quick Pond VII, 30 (Lg); Hammonton, Tuckerton, Bamber VIII, 23, 24 (Dke); very local but common where it occurs. All the species of this genus live on or in water plants, and are usually found on lily pads or other pond vegetation.

D. cincticornis Newn. Staten Island (Lg); Clementon VIII, Atco VI, DaCosta VII (W); Tuckerton VIII, 24 (Dke); Sea Isle V, 24, Anglesea VII (Brn).

var. proxima Kirby. Throughout State, more common and widely distributed than the type form.

D. palmata Oliv. Throughout the State V, VIII; usually common.

D. hypoleuca Lac. Hopatcong (Pm); Spring Lake VIII (Ch); New Brunswick (Coll); Clementon VII, 6 (Horn).

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- var. *rufescens* Lac. Tuckerton VIII, 24 (Dke); Clementon VIII, 6 (W); Anglesea V, VII (div).
- D. *piscatrix* Lec. Greenwood Lake (Bt); Staten Island (Lg); Westville VII, Clementon VIII (W); Woodbury V, 31, Sea Isle V, 24 (Brn); Lucaston VI (Dke); Durham Pond VIII, 18, Cramer Hill V, VII (GG).
- D. *subtilis* Kunze. Throughout the State III, VI, VII, VIII, XII. The "hirticollis" of previous edition belongs here.
- var. *rugosa* Lec. Hopatcong (Pm); Staten Island (Lg); Spring Lake IX (Ch); Riverton VII, 16 (GG).
- D. *æqualis* Say. Throughout the State, fall and spring, common.
- D. *tuberculata* Lac. Throughout the State, VI, VII, local, not common.
- D. *distincta* Lec. Hudson Co. (Ll); Newark (Bf); Merchantville IV, 2, Westville V, 27 (W).
- var. *torosa* Lec. Camden, Gloucester Co. (W); Manumuskin IV, 28 (Dke).
- D. *pusilla* Say. New Jersey (Horn, Li); Boonton VI, 12, Clementon V, 16 (GG).
- D. *femoralis* Kirby. Greenwood Lake (Bt).
- D. *emarginata* Kirby. Snake Hill V, 17 (Bf); Camden, Gloucester Co. (W).
- D. *metallica* Ahrens. Lake Hopatcong (Pm); Westville V, Clementon V (GG).
- D. *flavipes* Kirby. Newfoundland V (Ds); Westville VI, Gloucester VI (W); Cramer Hill VI, 11 (GG); Anglesea V, VII (Brn).
- D. *rufa* Say. Newfoundland V (Ds); Greenwood Lake (Sf); Westville V, Atco VI (W).
- D. *kirbyi* Lac. Camden IV, 24, Collingswood IV, 20, Atco VI, 13 (GG).

HÆMONIA Latr.

- H. *nigricornis* Kirby. Westville (W); g. d. (Li); in low meadows.

ORSODACHNA Latr.

- O. *atra* Ahr. Greenwood Lake (Jl); Madison (Pr); Ft. Lee (Bt); Newark Dist. (Bf); from mid IV-VI on early blossoms of all kinds; very local.

ZEUGOPHORA Kunze.

- Z. *consanguinea* Cr. Hewitt (Jl); Madison VIII (Pr); Newark (Bf).
- Z. *varians* Cr. Palisades (Jl); Orange Mts. (Bf); rare; on poplar VI (Hn).

SYNETA Esch.

- S. *ferruginea* Germ. Throughout the State V, VI, local, not common.

LEMA Fabr.

- L. *brunnicollis* Lac. Palisades VI, 7 (Lv); Ft. Lee on thistle (Bt); Hudson Co. (Ll); Newark (Bf).

L. collaris Say. Newark, g. d., rare on thistle (Bt).

L. solani Fabr. Anglesea, one specimen (W).

L. trilineata Oliv. The "old-fashioned potato beetle," throughout the State, V-VIII sometimes locally common; usually checked by the applications against the "Colorado beetle," and in most places almost exterminated.

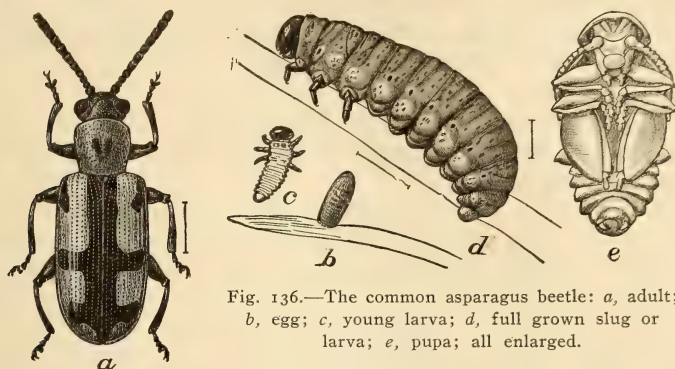


Fig. 136.—The common asparagus beetle: *a*, adult; *b*, egg; *c*, young larva; *d*, full grown slug or larva; *e*, pupa; all enlarged.

CRIOCERIS Geoff.

C. asparagi Linn. Throughout the State wherever asparagus grows, from early spring to late fall, in some stage; hibernates as an adult. An imported species, often very injurious. On young plants brush the slugs from the shoots to the ground on the middle of a hot sunny day. On larger plants apply dry hydrate of lime with a powder gun very early when the plants and slugs are a little moist. Destroy all volunteer asparagus; in bearing fields let trap shoots grow until covered with eggs, then cut and destroy them.

C. 12-punctata Linn. Also an introduced asparagus feeder, more recently arrived, not so common and not so widely distributed in the northern half of the State as the preceding.

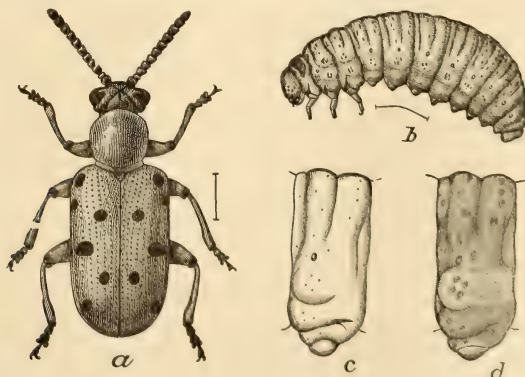


Fig. 137.—The 12-spotted asparagus beetle: *a*, adult; *b*, larva; *c*, *d*, segments of same; all enlarged.

ANOMCEA Lac.

- A. laticlavata** Forst. Delaware Valley region and northward V-VII on "Desmodium" and "Robinia," somewhat local, and not common.

COSCINOPTERA Lac.

- C. dominicana** Fab. Throughout the State V, VI, not common; adults on sumac (Ch); cocoons found under stone with "*Formica shaufussi*," Newfoundland IV, 27, adults V, 15 (Ds).

BABIA Chevr.

- B. quadriguttata** Oliv. Throughout the State VI-VII, not rare; on "*Ceanothus americanus*" (Ch).

SAXINIS Lac.

- S. omogera** Lac. Throughout the State V-VII; not common.

CHLAMYS Knoch.

- C. plicata** Fab. Throughout the State, nowhere common V, VI; on hazel, blackberry, alder, huckleberry, oak, etc.
var. *polycocca* Lac. With the type and even more rare.
C. foveolata Knoch. Atco, DaCosta (W).

EXEMA Lac.

- E. conspersa** Mann. Throughout the State V, VI; not rare.
E. gibber Oliv. With the preceding and once considered identical.

BASSAREUS Hald.

- B. congestus** Hald. Ft. Lee and southward throughout the State VI-VIII, on "Alnus" and "Clethra"; at Anglesea a small variety occurs (Li).
B. formosus Mels. Hudson Co. (Ll); Orange Mts. VI (div); Merchantville VI, VII (div); Atco VI, Newtonville VI (Brn); DaCosta (W); Lahaway V, 28 (Sm); on "*Sambucus*" (Hn).
var. *sulfuripennis* Mels. Sparta VII (Ds).
B. detritus Oliv. Clifton V, on "*Ceanothus americanus*" (Ch).
B. mammifer Newn. Throughout the State VI, VII on hickory, hazel (Hn), and "*Ceanothus americanus*" (Ch).
var. *sellatus* Suffr. Orange Mts. (Bf); Anglesea VII (div).
var. *luteipennis* Mels. Ft. Lee (Bt); Hudson Co. (Ll); Anglesea (W).
var. *pretiosus* Mels. Woodside, Orange Mts. (Bf).
B. lituralis Fab. Throughout the State V-VII; locally common.
var. *recurvus* Say. Westville VII, Atco, DaCosta VI (W); g. d., rare (Bf).
var. *lativittis* Germ. With the type, but more rare.

CRYPTOCEPHALUS Geoff.

- C. notatus* Fab. Throughout the State V, VI; locally common; on oak, blackberry, "Ceanothus." The variety "4-maculatus" Say. is more common than the type.
- C. quadruplex* Newn. Throughout the State V-VII; the variety "4-guttulus" Suffr., with the type and locally the more common.
- C. guttulatus* Oliv. Orange Mts. to Cape May V-VII, on oak.
- C. leucomelas* Suffr. South Camden on poplar (W).
- C. venustus* Fab. Common throughout the State VI-VIII, on "Ceanothus," potato and other garden plants. The varieties "ornatus" Fab., "cinctipes" Rand. and "simplex" Hald. occur with the type more or less abundantly.
- C. insertus* Hald. Newark (Bf); throughout South Jersey VI, VII (W).
- C. calidus* Suffr. Hudson Co. (Ll); Ft. Lee (Bt); Orange Mts., West Bergen, rare (Bf), W. Berlin VI, Anglesea VII (Brn).
- C. gibbicollis* Hald. Lakehurst VI, VII, in low huckleberry (Jl); Iona, Atco VI (Brn); Brown's Mills VI, Malaga VII (Dke); DaCosta VII, Anglesea (W).
- C. trivittatus* Oliv. Ft. Lee (Bt); DaCosta VII, Atco VIII, IX (W).
- C. incertus* Oliv. Atco IX, 11 (Brn).
- C. mutabilis* Mels. Ft. Lee (Sf); Orange Mts. and Newark Dist. VII (div); Anglesea (W); on "Ceanothus," "Viburnum," hazel, oak, etc.
- C. badius* Suffr. Caldwell (Cr).
- C. schreibersii* Suffr. Newfoundland IX, 2 (Jl); Hudson Co. (Ll); Orange Mts., Woodside (Bf); New Brunswick (Coll); Malaga IX, 15 (GG); always on pine.
- C. tinctus* Lec. Staten Island, beaten from hickory (Lg).
- C. striatulus* Lec. Ft. Lee (Bt); Hudson Co. (Ll); Orange Mts. (Bf).
- C. pumilus* Hald. is an error of determination.

PACHYBRACHYS Chevr.

- P. morosus* Hald. Newtonville VI (Brn); Clementon V, 21 (GG); DaCosta, Atco VI, 2, Cape May C. H. (W).
- P. litigiousus* Suffr. W. Berlin VI, 23, DaCosta VI, 3, Anglesea (W).
- P. abdominalis* Say. New Jersey (W).
- P. othonus* Say. Piedmont Plain and northward VI, VII; common.
- P. pubescens* Oliv. (viduatus Fab.) New Jersey (W).
- P. picturatus* Germ. Jamesburg VII, 4 (Jl).
- P. trinotatus* Mels. Throughout the State, not rare, VI, VII, on "Baptisia" and "Ceanothus."
- P. intricatus* Suffr. Throughout the State V-VII; not uncommon.
- P. tridens* Mels. Boonton VI, 6 (GG); Ft. Lee (Bt); Hudson Co. (Ll); Newark Dist. (Bf); Clementon, Atco VI, 2 (W); Anglesea VI, 20 (Sm); on sumac, poison ivy when in bloom and on "Ceanothus."

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- P. carbonarius* Hald. Woodside, Snake Hill V, 31 (Bf); Staten Island (Lg); throughout South Jersey V, VI (W).
P. luridus Fab. Ft. Lee (Bt); Hudson Co. (Li); Clifton V (Ch); Merchantville V, 23, Atco VI, 13 (GG).
P. atomarius Mels. Throughout the State V-VIII, on "Ceanothus."
P. femoratus Oliv. Newark (Soc); Anglesea (W).
P. infaustus Hald. Throughout the State V, VI; locally common.
P. hepaticus Mels. Woodside, rare (Bf); Anglesea VII, 12 (Bf).
P. subfasciatus Hald. Throughout the State V, VI; not rare.
P. dilatatus Suffr. Orange Mts., Newark (Bf); New Jersey (Horn).

MONACHUS Chevr.

- M. ater* Hald. Ft. Lee (Bt); Orange Mts. (Bf); Jamesburg V-VIII (Sm); Lakehurst VII, IX (Jl); Merchantville VI, Westville VII (GG).
M. saponatus Fab. Staten Island (Lg); throughout the Delaware Valley region VI, VII (div); Anglesea VII, 12 (Brn).

DIACHUS Lec.

- D. auratus* Fab. Throughout the State VI, VII; common.
D. squalens Suff. Jamesburg VII, 15 (Sm).
The "D. levis" Hald. of the previous list is an error.

TRIACHUS Lec.

- T. atomus* Suffr. Throughout the State V-VII on huckleberry, "Myrica," etc.
T. cerinus Lec. Snake Hill (Sf); Sandy Hook (Bt); g. d. (Li).
T. postremus Lec. Jamesburg VII, 4, DaCosta, Atco VI, 4 (W); Newtonville VI, 5 (Brn).

ADOXUS Kirby.

- A. obscurus* Linn. (vitis Fab.) Madison (Pr); Ft. Lee (Bt); Orange Mts. V, 30 (W).

FIDIA Baly.

- F. viticida* Walsh. Throughout the State on grape, not rare; but not thus far in harmful numbers.
F. longipes Mels. Caldwell (Cr); New Brunswick; also feeds on grape and "Ampelopsis" and is sometimes abundant.

XANTHONIA Baly.

- X. 10-notata* Say. Common throughout the State V-VIII, on oak.
X. villosula Mels. Throughout the State VI-VIII, on oak and hazel; common.

GLYPTOSCELIS Lec.

- G. pubescens* Fab. Throughout the State IV-VII, on spruce and pine.
G. barbata Say. Madison (Pr); Newark Dist. (Bf); Ft. Lee (Sf); Westville V, 9, Lucaston IV, 29, DaCosta (W); found on hickory; not common.

GRAPHOPS Lec.

- G. pubescens* Mels. Throughout the State V-VIII; at roots of evening primrose (Ch); common.
- G. curtipennis* Mels. Delaware Valley and pine barrens V, VI.
- G. marcassita* Cr. Hopatcong (Pm); Ft. Lee, Snake Hill (Sf); Newark (Bf).
- G. simplex* Lec. Salt meadows, rare (Bf).
- G. nebulosus* Lec. Newark Dist. (Bf); Ocean Co. (Sm); g. d. (W); larva in the roots of strawberries and sometimes injurious.

TYPOPHORUS Er.

- T. viridicyanea* Cr. North Jersey (Dietz); Plainfield VII, on wild morning glory (Rummel); Jamesburg IX (Lg); Camden II, 20 (GG).
- T. canellus* Fab. Throughout the State V-X on a great variety of trees and plants; larvæ sometimes injurious on strawberry, raspberry, etc. Many varieties are listed, and their relation to each other is by no means established. It is almost certain that several of them will be found to be good species.
- var. *aterrimus* Oliv. Greenwood Lake, Ft. Lee (Bt); Newark (Bf); Cramer Hill, Merchantville VI (GG); along shore, Atlantic City to Anglesea VI, VII (div).
- var. *gilvipes* Horn. Delaware Valley and pine barrens VI-IX (div); New Brunswick VII (Coll); Newark (Bf).
- var. *thoracicus* Mels. Newark (Bf); throughout Camden and Gloucester Counties, fall to spring (div).
- var. *4-notatus* Say. Newark (Bf); Delaware Valley and pine barrens V-VII (div).
- var. *sellatus* Horn. With the preceding, sometimes very common.
- var. *vittatus* Horn. Atco V, Longport VI (W); Somers Pt. VI, Anglesea VI (Brn).
- var. *4-guttatus* Lec. Ocean Co. V, VI (Sm).
- var. *sex-notatus* Say. Atco V, DaCosta, Cape May C. H. (W); Bayside IX (Sm).
- var. *pumilus* Lec. Newark (Bf); Delaware Valley and pine barrens V-VIII (div).

METACHROMA Lec.

- M. quercata* Fabr. Hopatcong (Pm); Orange Mts. (div); throughout South Jersey on scrub oak V-VII; sometimes common.
- M. pallida* Say. Pine barrens and maritime, extending a little into the Delaware Valley; on scrub oak.
- M. lævicollis* Cr. Sandy Hook (Bt); Jamesburg, Anglesea VII (Sm); DaCosta VI, VII (Brn); Buena Vista VII (Li).
- M. luridum* Oliv. DaCosta VII, 4, on scrub oak (W).

CHRYSOCHUS Redt.

- C. auratus** Fab. Locally common throughout the State V-VII, on milkweed and dog-bane; the larvæ feeding about the roots.

TYMNES Chap.

- T. tricolor** Fab. Throughout the State, local and sometimes common VI, VII, on chestnut, hickory, etc.
T. metasternalis Cr. Staten Island (Lg); Anglesea VII, 23 (div); on "Cratægus" (Hn).

COLASPIS Fab.

- C. favosa** Say. DaCosta VII, Sea Isle VI (Brn); g. d. (Li).
C. brunnea Fab. Throughout the State, locally common VI, VII; feeds on foliage of grape, strawberry, potatoes, beans, etc.; the larva on roots of grape; but not injurious with us.
 var. **flavida** Say. Distributed as above and is the common form.
 var. **costipennis** Cr. Jamesburg VI, VII on "Clethra alnifolia" (Sm); Lakehurst VII, 4 (Bf); DaCosta VI (W); Clementon V, VI (div); Newtonville VI, 19 (Brn).

RHABDOPTERUS Lef.

- R. picipes** Oliv. Throughout the State south of the Piedmont Plain VI, VII, feeds on myrtle, grape and basswood.

NODONOTA Lef.

- N. tristis** Oliv. Throughout the State VII; attacks plum, cherry and other fruit trees (Ch), "Lespedeza" and "Ceanothus" (Hn).
N. clypealis Horn. Ft. Lee (Sf); Newark (Bf); Atlantic Highlands VII, 11 (Lv); South Jersey VI, 2 (Sm); Westville (W).
N. convexa Say. Westville (W); on "Ambrosia trifida" VII, VIII (Hn).
N. puncticollis Say. Throughout the State VII, common; on roses (Hn), blackberry, raspberry and red clover (Ch).

CHRYSODINA Baly.

- C. globosa** Say. Throughout the State IV-VI, locally not rare.

PRASOCURIS Latr.

- P. vittata** Oliv. Throughout the State IV-VII; locally common.
P. phellandri Linn. Hopatcong (Pm).

LABIDOMERA Chevr.

- L. clivicollis** Kirby. Throughout the State VI, VII, on milkweed, but local and by no means very common.

LEPTINOTARSA Stal.



Fig. 138.—The 10-lined potato beetle: *a*, egg patches; *b*, larvæ in different stages of growth; *c*, pupa; *d*, beetle—all natural size; *e*, elytrum of beetle enlarged.

- L. 10-lineata** Say. The common "potato-bug" or beetle; occurs throughout the State on potatoes, tomatoes, egg-plants and other "Solanaceæ" from early spring to late fall. Persistent treatment with arsenates is indicated and arsenate of lead is now the most usual material, at the rate of 10 pounds to 100 gallons of water.

ZYGOGRAMMA Chevr.

- Z. suturalis** Fab. Throughout the State IV–VIII, on ragweed, etc., by no means common and always local. The var. "casta" Rogers is reported from Staten Island (Lg).

CALLIGRAPHA Er.

- C. lunata** Fab. Greenwood Lake (Sf); Caldwell (Cr); Newark Dist., rare (Bf); on "Rosa" (Bt).
- C. similis** Rog. Throughout the State V–VIII, on ragweed, locally common.
- C. elegans** Oliv. Throughout the State, V–VIII, on "Bidens" and "Ambrosia," local and hardly common.
- C. scalaris** Lec. Greenwood Lake V, 20 (Lv); Caldwell (Cr); Ft. Lee (Bt); Newark Dist. (Bf); Gloucester VIII, 16 (W); feeds on elm; not common.
- C. rowena** Knab. Chester VII, 4 (div); food plant unknown.
- C. rhoda** Knab. Newark district (Bf); feeds only on hazel "Corylus" (Knab).

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C. amelia Knab. Chester, Newark Dist. (Bf); feeds on alder only (Knab).

C. philadelphia Linn. Ft. Lee (Bt); Caldwell (Cr); Orange Mts. VI (Bf); Riverton V, 30 (GG); throughout Camden and Gloucester Co. IV-VI (div); Lahaway V-VII on "Cornus" only (Sm).

var. *spirææ* Say. With the type and locally replacing it.

C. bigsbyana Kirby. Throughout the State, more common northwardly V, VI on maple, willow and alder. The records credited to "multi-punctata" Say. in the last edition really belong here.

It is quite likely that some of the records credited to "*scalaris*" and "*philadelphia*" belong to Mr. Knab's species, and that these are of wider distribution than here indicated.

PHÆDON Latr. (PLAGIODERA Redt.)

P. viridis Mels. Orange Mts. (Soc); g. d. not rare (Bf); Camden (W).

P. cochleariæ Gyll. Hopatcong (Pm).

GASTROIDEA Hope.

G. polygoni Linn. Throughout the State VI-IX, common; occasionally even on house plants in cities and towns.

G. cyanea Mels. Throughout the State VII, common; on "Rumex" (Hn).

MELASOMA Steph. (LINA Megerle.)

L. lapponica Linn. Hewitt VI, 18, Newfoundland VII, 6 (Jl); Orange Mts. (Bf); g. d. (W); on alder and willow.

L. tremulæ Fab. Anglesea VI, 12, one example (Brn).

L. scripta Fab. Throughout the State VI, VII, on willow and poplar; often common, and sometimes locally injurious.

L. obsoleta Say. Greenwood Lake VI, 21 (Lv); Newark (Bf).

PHYLLODECTA Kirby.

P. vulgatissima Linn. Hopatcong (Pm); Ft. Lee VIII, IX (Bt); Madison (Pr); Orange Mts. (div); on willow and poplar.

TRIRRHABDA Lec.

T. tomentosa Linn. Maritime strip V-IX, common on "Solidago."

T. virgata Lec. Hopatcong (Pm); Sandy Hook VIII, IX (Bt).

T. canadensis Kirby. Local throughout the State on "Solidago," common along shore in July.

T. luteicincta Lec. New Jersey coast, near Long Branch (Horn). Mr. Schwarz insists that this is an error in the locality label, and that the species does not belong to New Jersey.

GALERUCELLA Cr.

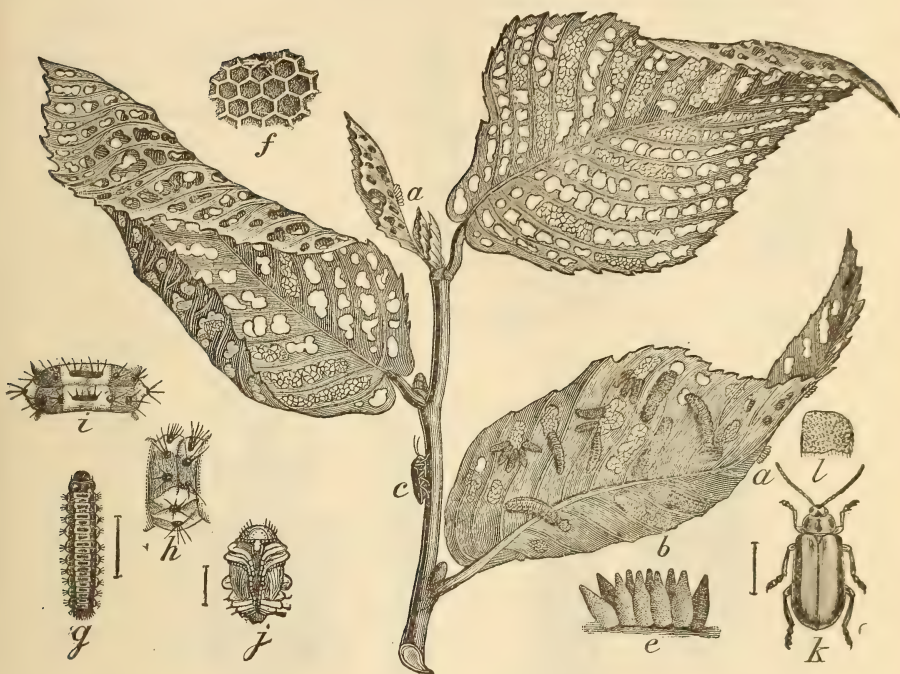


Fig. 139.—The elm-leaf beetle: *a*, egg patches on leaves; *b*, larvæ feeding; *c*, adult; all natural size; *e*, egg mass; *f*, surface of egg; *g*, larva; *h*, *i*, larval details; *j*, pupa; *k*, beetle; *l*, surface of elytra: all enlarged.

G. americana Fab. Throughout the State VI, VII, on "Solidago."

G. sexvittata Lec. Jamesburg VII, 6 (Jl); Anglesea VII, 23 (Sm).

G. cavicollis Lec. East Jersey (Dietz); Atco VI, 4, Anglesea (W); Sea Isle V, 22 (Brn); feeds on peach, plum and cherry.

G. rufosanguinea Say. Throughout the State V–VIII, locally common; feeds on "Azalea" (Hn).

G. integra Lec. Caldwell (Cr); Anglesea VIII, 13 (W).

G. notulata Fab. Throughout the State V–VIII; more common in South Jersey; larva on "Ambrosia" (Hn).

G. notata Fab. Throughout the State VI–IX; often common; in all stages on "Eupatorium perfoliatum" (Ch).

G. nymphææ Linn. Throughout the State, on water lilies; larvæ defacing leaves and sometimes flowers as well.

G. tuberculata Say. Greenwood Lake VI, 21 (Lv); New Jersey (Bt); on willow (Hn).

G. decora Say. Anglesea VII, common (Sz); in all stages on willow.

- G. luteola** Müll. The elm-leaf beetle; common throughout the State, and usually more or less injurious to city shade trees. There is only a single brood in most of the State, and thorough spraying with arsenate of lead, 1 lb. in 20 gallons of water, will prevent injury. One spraying should be made when the beetles first begin to feed, the second when the eggs begin to hatch, and the effort should then be to hit the underside of the leaves.

MONOXIA Lec.

- M. puncticollis** Say. On salt meadows, from the Passaic to Cape May VI, VII; usually not rare; strictly maritime.

DIABROTICA Chev.

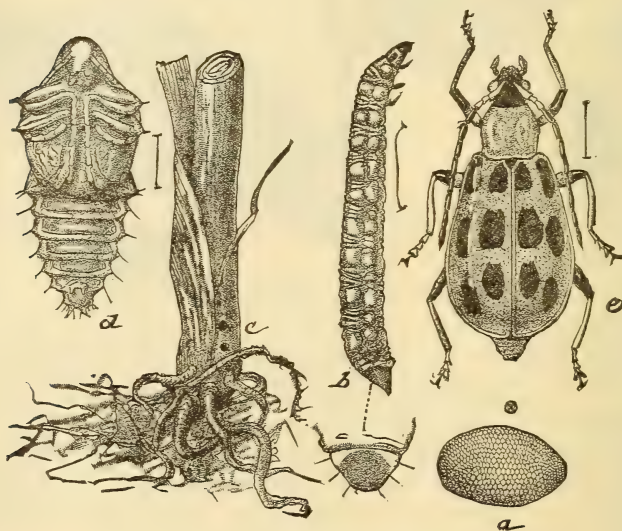


Fig. 140.—Spotted cucumber beetle, *Diabrotica 12-punctata*: a, egg; b, larva; c, holes drilled in corn stalks; d, pupa; e, adult: all enlarged.

- D. 12-punctata** Oliv. Common throughout the State IV–X on a great variety of plants and sometimes injuring cucurbs; larva in roots of corn and grasses.
- D. vittata** Fab. The “striped cucumber beetle”; throughout the State; common and often seriously injurious to cucurbs. The beetle eats into the stem at the surface, the larva mines in it a little underground. Most of the injury is done by the beetles, which attack the plants soon after they are up, and a great variety of methods are employed to prevent it. Sometimes carbolized lime or lime and turpentine are applied in the hill, or a dead fish, or freshly ground bone,

or sand and kerosene. Ground tobacco is a favorite repellent, and land plasters often replace lime. On small fields netting covers are used to protect the plants, and occasionally only an excess of seed is planted so that some plants may escape injury.

- D. atripennis* Say. Ft. Lee (Sf); Hudson Co. (Ll); Caldwell (Cr).

PHYLLOBROTICA Redt.

- P. discoidea* Fab. Ft. Lee (Bt); Hudson Co. (Ll); Newark, Orange Mts. (Bf); Woodbury, Brigantine, Orange Mts. VI-VII (W).

- P. decorata* Say. Arlington VI, on "Scutellaria" (Sf).

- P. vittata* Horn. Fort Lee (Sf).

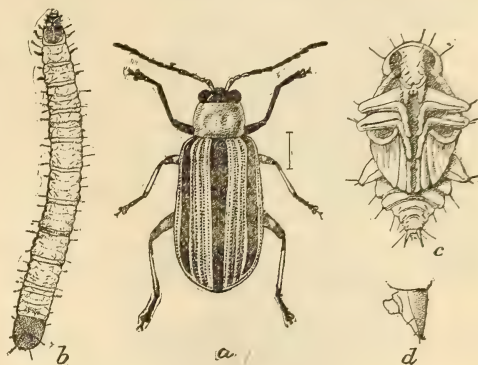


Fig. 141.—The striped cucumber beetle, *Diabrotica vittata*: a, adult; b, larva; c, pupa; d, side view of anal segment of same.

LUPERODES Mots.

- L. meraca* Say. Greenwood Lake VI, 21 (Lv); Ft. Lee, Orange Mts. VI, 10 (Bt); Newark (Bf); on wild rose (Hn) and many other plants (Ch).

- L. cyanellus* Lec. Staten Island (Lg); occurs with the preceding, and may be confused with it in collections.

CERATOMA Chev.

- C. trifurcata* Forst. Throughout the State VI, VII; common on peas, beans and leguminous plants generally.

BLEPHARIDA Rog.

With this species begins the series of forms characterized by enlarged hind femora and a well-developed power of leaping, which gives them the common and general term "flea-beetles."

- B. rhois* Forst. Throughout the State VII; more common in the southern districts; the larva, covered by excrement, feeds on sumac.

HYPOLAMPSIS Clark.

- H. pilosa* Ill. Madison VIII (Pr); Orange Mts. (Bf); Jamesburg VI (Jl); Merchantville III, Westville VII (W); Newtonville VII (Brn); along shore, Brigantine to Cape May V-VII (div).

PACHYONYCHUS Chev.

- P. paradoxus* Mels. Atlantic City (Castle); lives on "Smilax" sp. (Sz).

CEDIONYCHIS Latr.

- Ce. gibbitarsa** Say. Newark, salt meadows (Bf); Cramer Hill VI (GG); Woodbury VI, Anglesea VI (W); g. d. (Li); Brigantine IX (Hn).
Ce. thoracica Fab. Throughout the State IV-VII; not common.
Ce. vians Ill. Throughout the State III-V; not common.
Ce. fimbriata Forst. Hopatecong (Pm); Orange Mts., Newark (Bf).
Ce. petaurista Fab. DaCosta VII, 5 (W); seashore (Li).
Ce. miniata Fab. Woodside, Orange Mts. IV, VIII (Bf); Atco V, 29 (W); Sea Isle V, Avalon VI (Brn); Anglesea (Li).
Ce. limbalis Mels. Throughout the State IV-IX; never common.
 var. **subvittata** Horn. Madison VII (Pr); DaCosta (W); Lahaway V (Sm).
Ce. sexmaculata Ill. Greenwood Lake V, 22 (Lv); Madison VII (Pr); Newark, common on ash (Bf); g. d. (W, Li).
Ce. suturalis Fab. Newark (Coll); Atco IX, Clementon V, 15 (W); Egg Harbor, Cape May Co. V, 24 (Sm).
Ce. quercata Fab. Throughout the State V, VI, IX; not rare.
Ce. scalaris Mels. Egg Harbor (Li); Anglesea (W).

DISONYCHA Chev.

- D. pennsylvanica** Ill. Newark Dist. (Bf); Westville V, DaCosta V, Anglesea V (W); Clementon V, VII (div); Lahaway V, 28 (Sm). The varieties "limbicollis" Lec. and "pallipes" Cr. occur with the type; but more rarely. On "Polygonum" (Bt) and "Sagittaria" (Ch).
D. quinquevittata Say. Fort Lee VIII (Bt); very rare; on willow (Ch).
D. crenicollis Say. Hudson Co. (Li); Delaware Valley and pine barrens IV-VIII, not rare.
D. caroliniana Fab. Throughout the State IV-VII, not rare; bred from larva feeding on "Portulacca oleracea" (Ch).
D. glabrata Fab. Ft. Lee (Bt); Hudson Co. (Li); salt meadows (Bf); DaCosta VII, 29 (W); Sea Isle V, Anglesea (Brn); larva on "Amaranthus" (Ch).
D. triangularis Say. Ft. Lee (Bt); Hudson Co. (Li); Madison (Pr); salt meadows (Bf); larva on "Chenopodium" and "Amaranthus," the adult exceptionally injurious to beets and spinach (Ch).

Fig. 142.—Grape flea-beetle, *Haltica chalybea* in all stages on a grape shoot.

Fig. 143.—Grape flea-beetle, *Haltica chalybea*: larva, adult and jumping hind leg, enlarged.

Fig. 144.—Striped flea-beetle, *Phyllotreta vittata*: a, larva; b, adult beetle.

Fig. 145.—Striped sweet potato beetle, *Cassida bivittata*: 1, larvæ or "peddlers" on leaf; 2, larva; 3, pupa; 4, adult: all save 1 enlarged.

Fig. 146.—Black-legged tortoise beetle, *Cassida nigripes*: a, "peddlers" on leaf; b, larva; c, pupa; d, adult: all save a enlarged.

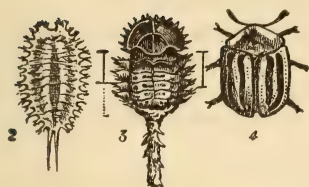


Fig. 145.

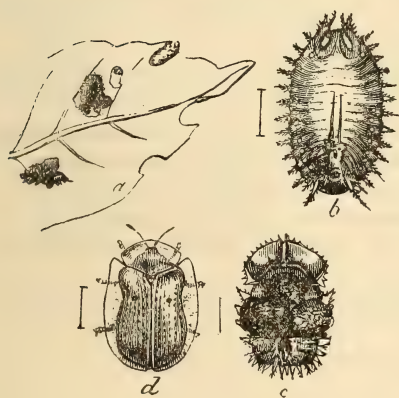


Fig. 146.



Fig. 144.



Fig. 142.



Fig. 143.

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D. xanthomelæna Dalm. Throughout the State, VII, VIII; the "Spinach flea beetle," which has not yet been injurious with us. Natural food plants are "*Chenopodium*," "*Stellaria*" and perhaps "*Amaranthus*" (Ch).

D. collata Fab. Ft. Lee (Bt); Hudson Co. (Ll); Anglesea (W); g. d. (Li).

D. mellicollis Say. Hudson Co. (Ll); Clementon V, 30 (GG)); Sea Isle V, VI (Brn); Anglesea VII, and g. d. (W).

The record of "*cervicalis*" Lec. is an error.

HALTICA Geoffr.

H. bimarginata Say. New Jersey (Horn).

H. chalybea Ill. The "grape flea-beetle"; occurs throughout the State V-VII and is sometimes locally injurious. Can be readily controlled by the use of arsenites when the larvæ are feeding.

H. ignita Ill. Throughout the State V-VIII; attacks strawberry (Ch), and is common on "*Azalea*," "*Rosaceae*," etc. (Hn). At Anglesea a small, southern, green form occurs (W).

H. kalmiæ Mels. With the preceding and is a cupreous form, feeding on "*Kalmia latifolia*" (Ch).

H. marevågans Horn. Throughout the State VI-IX on evening primrose; more common in South Jersey, and especially along shore.

H. fuscoænea Mels. Orange Mts. (Bf); Atl. Highlands VII, 11 (Lv); throughout South Jersey V-IX; especially common along shore on evening primrose, the foliage of which is sometimes completely riddled.

H. rufa Ill. Greenwood Lake VI (Sf); Orange Mts., Newark (Bf); Spotswood (Jl).

The "*punctipennis*" Lec. of last edition is an error.

ORTHALTICA Cr.

O. copalina Fab. Throughout the State VII; on sumac (Ch).

CREPIDODERA Chev.

C. rufipes Linn. Throughout the State VI, VII; common. On honey locust (Bf), and sometimes injurious to grape, peach, apple and other fruit trees.

C. helexinus Linn. Throughout the State V-IX, common on willow and poplar; exceptionally attacks leaves of fruit trees (Ch).

C. modeeri Linn. South Orange (Lg).

C. atriventris Mels. Throughout the State in July.

EPITRIX Foudr.

E. fuscula Cr. Throughout the State, not common, on "*Solanacea*."

E. cucumeris Harr. The "cucumber flea-beetle"; found everywhere throughout the summer on potatoes and other "*Solanacea*" as well

as on cucurbs and many other garden crops. Make little round holes in the leaves and are usually controlled by using bordeaux mixture and Paris green.

- E. parvula* Fab. The "tobacco flea-beetle"; rare in New Jersey; found Westville I, 28, in hibernating quarters (W).

MANTURA Steph.

- M. floridana* Cr. Arlington, under stones in early spring (Bf); throughout South Jersey V-VII; hibernates as an adult.

CHÆTOCNEMA Steph.

- C. subcylindrica* Lec. Newark, under stones III, 14 (Bf); Westville (Li); Camden I, Collingswood IV, Merchantville V, 8 (Brn); rare.
- C. denticulata* Ill. Throughout the State V-VII; on corn and millet (Ch).
- C. minuta* Mels. Newark (Bf).
- C. alutacea* Cr. Anglesea VI (Coll).
- C. obesula* Lec. Newark (Bf); a South Atlantic form.
- C. parcepunctata* Cr. Irvington III (Bf); Staten Island (Lg).
- C. pulicaria* Mels. Throughout the State III, V, VII, locally common; sometimes injurious to corn and millet (Ch).
- C. confinis* Cr. Throughout the State all winter until VI, 25, again VIII until frost. The "sweet potato flea beetle," found on "Convolvulacea" in general. In South Jersey often injures sweet potato plants soon after they are set out; larva feeds on roots of bind-weeds. Plants may be protected by dipping tops before they are set out in arsenate of lead 1 pound in 10 gallons of water.
- "*C. pinguis*" Lec. is omitted as an error of record.

SYSTEMA Clark.

- S. hudsonias* Forst. Throughout the State VII, VIII; common on many plants.
- S. frontalis* Fab. With the preceding VI, VII; feeds on "Polygonum" and "Chenopodium," and sometimes on cultivated crops (Ch), e. g., cranberries (Sm).
- S. elongata* Fab. Orange Mts., rare (Bf).
- S. tæniata* Say. Throughout the State VI, VII, sometimes abundant on carrots, parsley, etc. The var "blanda" Mels. is as common as the type, on ragweed. Arsenites are indicated whenever they can be safely employed; otherwise a strong tobacco decoction will answer almost as well.
- S. marginalis* Ill. Ft. Lee (Bt); Orange Mts. (Bf); Spring Lake (Ch); Clementon VIII, 6 (W); sometimes abundant on oak (Hn).

LUPERALTICA Cr.

- L. fuscula** Lec. Newark Dist. (Bf); Jamesburg (Coll); Merchantville IX, 6 (GG); DaCosta VIII, Lucaston IX (Dke); not common.
L. senilis Say. Newark (Bf); Riverton IX, Glassboro VII, IX (GG); DaCosta VIII, Atco IX (W); not common.

GLYPTINA Lec.

- G. bicolor** Horn. Anglesea (W).
G. spuria Lec. Hudson Co. (Li); g. d. rare (Li); on "Monarda punctata" (Hn).

PHYLLOTRETA Foudr.

- P. sinuata** Steph. Hopatcong (Pm); Madison VIII (Pr); Hudson Co. (Li); Camden I (GG); Burlington Co., Westville I, VII, 2 (W).
P. vittata Fab. Common all summer on cabbage and other "Cruciferæ."
P. bipustulata Fab. Ft. Lee (Bt); Orange Mts. V, 30 (Bf); Camden III, 3, Anglesea VI, 26 (W); g. d. (Li).
P. chalybeipennis Cr. Sandy Hook to Cape May, along shore VII, VIII; a maritime form on "Cakile americana" (Ch).
P. picta Say. Throughout the State IV-VII, not rare; on hickory sprouts (Hn).

LONGITARSUS Latr.

- L. testaceus** Mels. Newark, under stones, early spring (Bf); Westville VII, 2, So. Jersey g. d. (W); Sea Isle VII, 12 (Brn).
L. turbatus Horn. Staten Island (Lg).
L. melanurus Mels. Ft. Lee, Snake Hill (Sf); Newark III, 5 (Bf).
L. insolens Horn. Newark (Bf); Jamesburg VII, 4 (Lg); Anglesea (W); g. d. (Li); New Jersey (Horn).
 "Alternatus" Ziegl. in the last edition is an error.

DIBOLIA Latr.

- D. borealis** Chev. Throughout the State VI, VII; lives on plantain, but exceptionally attacks turnip (Ch).

PSYLLIODES Latr.

- P. punctulata** Mels. Throughout the State, late fall and until next July; often common; adult devours leaves of rhubarb (Ch).
P. convexior Lec. Hudson Co. (Li); Anglesea (W); g. d. rare (Li).
 This ends the flea beetle series.

MICRORHOPALA Baly.

- M. vittata** Fab. Throughout the State V-VII, IX; not rare; larva mines the leaves of goldenrod.

- M. xerene* Newn. Hopatcong (Pm); Ft. Lee (Sf); Camden, g. d., in wet places (W); Westville (Li); Burlington Co. VI (GG); larva in goldenrod leaves.
- M. erebus* Newn. Jamesburg VI, rare (Sm).
- M. excavata* Oliv. Hopatcong (Pm); Ft. Lee (Bt); Hemlock Falls VII, 4 (W); Jamesburg VI, 24 (Jl); Newtonville (Brn); DaCosta VI, Atco IX (W).
- M. porcata* Mels. Ft. Lee (Bt); Hudson Co. (Li); Wenonah (Li); very rare.

ODONTATA Chev.

- O. scapularis* Oliv. Throughout the State V, 30-VIII, 6, not rare.
- O. notata* Oliv. DaCosta V, 12 (W); g. d. (Li); on "Tephrosia virginica."
- O. bicolor* Oliv. Throughout the State V-VIII; locally common.
- O. hornii* Sm. Lakehurst VII, 4 (Bf); Atco (Li); DaCosta VII, 5 (W); on "Tephrosia virginica."
- O. dorsalis* Thunb. Throughout the State V, VI, VIII, common on locust, the larvæ making blotch-mines in the leaves; exceptionally attacks red clover, hog-peanut, some fruit trees, and larva has been reared on Soy beans (Ch).
- O. rubra* Web. Throughout the State with the preceding V, VII, IX; also common on "Robinia" and sometimes on basswood.
- O. nervosa* Panz. Throughout the State nearly all year, on locust; common.

CHARISTENA Baly.

- C. nigrita* Oliv. Irvington, Newark (Bf); DaCosta VII, 30 (W).
- C. ariadne* Newn. DaCosta VII, 30 (W); Atco (Li).

STENISPA Baly.

- S. metallica* Fabr. Ft. Lee (Sf); Snake Hill (Bt); Newark Dist. (Bf); Westville IV-VI (div); Merchantville III and g. d., throughout So. Jersey (W); Lahaway V, 28 (Sm); in swampy areas.

PHYSONOTA Boh.

- P. unipunctata* Say. Boonton III, VI, VII (GG).

CASSIDA Linn.

- C. nigripes* Oliv. Throughout South Jersey on sweet potato vines in May; not very abundant.
- C. bivittata* Say. Very common and often injurious to sweet potato vines throughout South Jersey. Mr. Schwarz says this is not originally a native of the State, but has spread northward with the cultivation of the sweet potato. It is one of the "gold-bugs," the larvæ

of which are known as "peddlers." They attack the plants soon after they are set out and injure them severely before they can get a start, especially in dry weather. Plants should be dipped when set in arsenate of lead, 1 pound in 10 gallons of water; but do not dip the roots.

COPTOCYCLA Chev.

- C. bicolor** Fab. (*aurichalcea* Fab.) Throughout the State on "Convolvulus" V, VI; common and destructive on sweet potatoes in South Jersey. A gold-bug like the preceding and amenable to the same remedies.
- C. signifer** Hbst. (*guttata* Oliv.) Throughout the State V, VI, more common southwardly, where it also attacks sweet potatoes.
- C. purpurata** Boh. Cramer Hill V, Woodbury VI, VIII, 29 (GG); Westville I, 28, in hibernating quarters (W).
- C. clavata** Fab. Throughout the State, usually not common; sometimes locally abundant on potatoes, etc., and causes injury.

CHELYMORPHA Chev.

- C. argus** Licht. Throughout the State, common; on "Convolvulus" and "Asclepias," and sometimes attack raspberries (Ch).

Family BRUCHIDÆ.

These are the pea and bean weevils, the larvæ of which live in the seeds of leguminous and other plants. The beetles are short and chunky, the wing covers cut off square behind so as to expose the tip of the obese abdomen; head small, posterior legs long, the thighs swollen, but not fitted for jumping. In color they are usually gray, mottled with black and white, the markings formed of scales and hair covering the surface, so that when these are rubbed off the beetles are mostly uniform black.

The injury is done chiefly to the stored product, peas, beans, lentils, and the like, and several larvæ are often found in the larger seeds. Fumigating with bisulphide of carbon kills these insects without injuring the germinating quality of the seeds, provided they are not exposed to the fumes more than twenty-four hours.

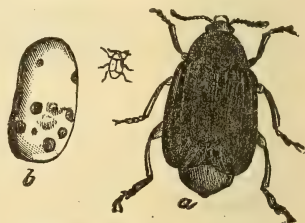


Fig. 147.—The "bean weevil," much enlarged: *b*, an infested bean.

SPERMOPHAGUS Sch.

- S. robiniae** Sch. Throughout the State IV–VIII, the larvæ in seeds of the honey locust "*Gleditschia*," but local and by no means common.

BRUCHUS Linn.

- B. rufimanus** Sch. Newark (Bf), in stored lentils.
- B. pisorum** Linn. The common "pea-weevil," which occurs abundantly throughout the State.
- B. mimus** Say. Atco (Li).
- B. chinensis** Linn. (*scutellaris* Fab.) Ft. Lee (Jl); an introduced species which will probably be found elsewhere in the State.
- B. 4-maculatus** Fab. Orange Mts. VII, 12 (Bf); New Jersey (Li).
- B. discoideus** Say. Anglesea V, 30, IX, 4 (div).
- B. bivulneratus** Horn. Hudson Co. (Li); Westville (W) in seeds of "Cassia."
- B. cruentatus** Horn. Plainfield, about cultivated peas (Sf); Riverton V, Lucaston V (GG); Atco V, VI (div).
- B. nigrinus** Horn. Newark V, 29 (Bf); Highlands (Sf); DaCosta (W); throughout South Jersey (Li).
- B. alboscuteUellatus** Horn. Throughout the State V-VII, breeds in seed capsules of "*Ludwigia alternifolia*."
- B. calvus** Horn. Delaware Valley region V-IX, extending a little into the pine barrens and the maritime.
- B. obtectus** Say. (*obsoletus* Say., *fabæ* Riley.) The "bean-weevil"; throughout the State; common and often seriously injurious.
- B. hibisci** Oliv. Woodbury (Li); Westville V-VIII (div); Clementon VI, Big Timber Creek VIII (GG); Anglesea V, 28-IX, 20 (div); very common in mallow swamps, breeding in the seed pods.
- B. longistilus** Horn. Atco VI, 2, Anglesea V, 30 (W); also breeds in seeds of mallow.
- B. musculus** Say. Throughout the State VII-IX; locally very common.
- B. macrocerus** Horn. Anglesea (W); New Jersey (Li).

The "*B. floridæ*" of the last edition was an error.

ZABROTES Horn.

- Z. subnitens** Horn. Westville V, 27 (Brn); Clementon V, 30 (GG); Atco, DaCosta, Buena Vista (Li); Manumuskin V, 5, on strawberry blossoms (Dke); Anglesea (W).

Family **TENEBRIONIDÆ**.

The "darkling beetles" are usually black or dark brown in color, oblong or oval in shape, with a peculiar, somewhat loosely-jointed appearance, and long, rather clumsy and awkward legs. The anterior and middle feet or tarsi are 5-jointed, while the posterior are 4-jointed only, and this is a character easily seen in these insects, which are usually of moderate or large size. In addition, the antennæ are moniliform or bead-like, and the

mouth parts comparatively small, not prominent. As a rule, they are feeders on fungi or on dead or dry wood or other vegetable products; hence scavengers rather than anything else. The larvæ are long, slender, often a little flattened like a wire worm, and they live in dead or decaying wood, dry vegetable products or fungi. A few are of economic importance as granary pests, but none attack growing crops.

EPITRAGUS Lat.

E. arundinis Lec. Common along the coast, Sandy Hook to Cape May, VII-IX, on reeds and grasses.

The "*E. canaliculatus*" Say. and "*E. tomentosus*" Lec. of the last edition were based on misidentifications.

SCHÆNICUS Lec.

S. puberulus Lec. Lakehurst VII, 4-6 (Bf).

PHELLOPSIS Lec.

P. obcordata Kirby. Hudson Co. (Ll); Ft. Lee (div); on dry fungus growths on trees; local and not common.

POLYPLEURUS Esch.

P. geminatus Sol. Lakehurst IX, 30 (Jl); on pine logs (Lg).

P. perforatus Germ. Manumuskin IV, 24 (Dke); it may be that this record really refers to the preceding.

BLAPS Newm.

B. similis Latr. Merchantville IV, 1 (Dke).

B. mortisaga Linn. Newark (Bf).

NYCTOBATES Guer.

N. pennsylvanica De G. Common throughout the State IV-VIII, under bark. The variety "*barbata*" Knoch, with the type.

MERINUS Lec.

M. lævis Oliv. Throughout the State IV-VII; not rare under bark.

UPIS Fabr.

U. ceramboides Linn. Ft. Lee (Bt); Newark (Soc).

HAPLANDRUS Lec.

H. femoratus Fabr. Throughout the State, under stones and bark, usually the latter; IV-VII.

H. ater Lec. With the preceding, but more rare.

SCOTOBATES Horn.

S. calcaratus Fabr. Throughout the State V-VII; not rare.

XYLOPINUS Lec.

X. saperdoides Oliv. Throughout the State VI, VII; not rare.

X. rufipes Say. Caldwell (Cr); So. Amboy (Bt); Malaga VII (GG); g. d. (W, Li).

X. ænescens Lec. Caldwell (Cr); So. Amboy (Bt); DaCosta VII, 27 (Dke).

TENEBRIO Linn.

T. obscurus Fabr. Throughout the State.

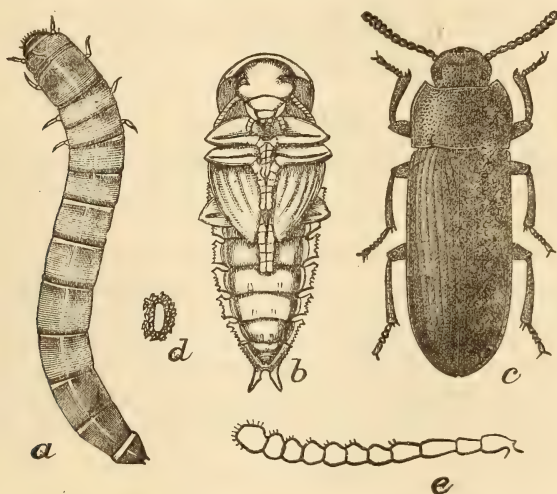


Fig. 148.—The yellow meal worm, *Tenebrio molitor*: *a*, larva; *b*, pupa; *c*, adult; *d*, egg; about twice natural size; *e*, antenna of adult, more enlarged.

T. molitor Linn. With the preceding. Both of these species are introduced and live in granaries, stables, store-houses and the like. The larvæ are the meal-worms, which occur wherever there is a neglected heap of grain refuse. Occasionally they are troublesome, but usually strict cleanliness, removing their breeding places, serves to keep them in check. When its use is practical, bisulphide of carbon will kill both adults and larvæ.

T. castanea Knoch. Lakehurst V (Jl); DaCosta (Li); Malaga V, 19, under pine bark (W); Manumuskin V (Dke).

T. tenebrioides Beauv. Throughout the State IV-VIII, under bark of trees, among rubbish in barns and outbuildings; not rare.

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OPATRINUS Latr.

- O. notus* Say. Common throughout the State under bark and stones.
O. aciculatus Lec. Hopatcong (Pm); Woodside (Bf); Jersey City; rare.

BLAPSTINUS Latr.

- B. moestus* Mels. Greenwood Lake (Bt); Brigantine Beach IX (Hn).
The "pratensis" Lec. of last edition was based on an example of this species.
B. pulverulentus Mann. New Jersey (GG).
B. interruptus Say. Brigantine IX (Hn); Anglesea VII (Sz); rare.
B. metallicus Fab. Throughout the State, all season, common; under stones, boards or chips in sandy places.

AMMODONUS Mus.

- A. fossor* Lec. West Bergen, rare (Bf).

EPHALUS Lec.

- E. latimanus* Lec. Along the shore, very rare in the sand.

TRIBOLIUM MacL.

- T. ferrugineus* Fab. Throughout the State; common.
T. confusum Duval. With the preceding and usually mixed with it. Both are introduced species, occurring in meal, farina and other cereals in stores and granaries. They eat also the eggs and larvæ of other meal insects and the dead of their own kind; but not the cast skins of their own larvæ. Remedial measures where such are needed are as for other of the granary insects already dealt with.

DICEDES Lec.

- D. punctatus* Lec. Ramapo XII, 6, Ft. Lee IV, 17, Highlands V, 30 (Sf).

GNATHOCERUS Thunb.

- G. cornutus* Fab. Also an imported species, on cereals with "Tribolium"; where the two occur together in a confined space the "Tribolium" eventually destroys the "Gnathocerus."

ALPHITOBIOUS Steph.

- A. piceus* Oliv. (*diaperinus* Panz.) Commonly found in storehouses, etc., among refuse; also an introduced species.

ULOMA Lap.

- U. impressa* Mels. Throughout the State VI-IX, under bark and in rotten wood; locally not rare.

- U. imberbis* Lec. Ft. Lee (Bt); Brigantine IX (Hn); g. d., common (W).
U. punctulata Lec. Spring Lake (Ch); Lucaston IV, 14, Manumuskin V, 5 (Dke); g. d., less common than the preceding (W).

EUTOCHIA Lec.

- E. picea* Mels. Ft. Lee, Snake Hill (Sf); Weehawken IV, 11 (Bt); Atlantic City (Castle); g. d. (div); found under stones and on moss.

ANÆDUS Blanch.

- A. brunneus* Ziegl. Common under old leaves throughout the State and found at almost all times in sifting.

PARATENETUS Spin.

- P. fuscus* Lec. Greenwood Lake, Ft. Lee (Sf); Camden XI, 3, sifting (W); Atco VIII, 26 (Brn); Anglesea VII (Sz).
P. punctatus Sol. Throughout the State VI-VIII; locally common.

PHALERIA Latr.

- P. testacea* Say. Common along shore from Sandy Hook to Cape May, all season, in the sand under washup of all kinds and in logs.

DIAPERIS Geoff.

- D. maculata* Oliv. (hydni Fab.) Throughout the State, locally common; feeding on fungi.

ARRHENOPLITA Kirby.

- A. viridipennis* Fab. Ft. Lee on oak fungus (Bt); Hudson Co. (Ll); Westville XI, 4 (GG); g. d., common (W).
A. bicornis Oliv. Common throughout the State on fungus on trees.

PLATYDEMA Lap.

- P. excavatum* Say. Common throughout the State under bark of trees infested with fungi; where also all our other species occur.
P. ruficorne Sturm. Throughout the State; locally common.
P. ellipticum Fabr. Merchantville III, IV, Westville IV (GG); g. d., locally common (W).
P. subcostatum Lec. Merchantville IX, Sea Isle VI, Anglesea VI (Brn).
P. americanum Lap. Ft. Lee (Bt); g. d., common (W). It is not unlikely that the records for this and the preceding really refer to one species.

CÆNOCORSE Thom.

- C. ratzeburgi* Wissm. Iona, in an abandoned barn (W); an introduced species feeding in stored grain products which has just established itself.

ALPHITOPHAGUS Steph. (PHYLETHUS Meg.)

- A. bifasciatus** Say. Throughout the State. Another introduced species commonly found in stables, granaries, etc., among refuse.

HYPOPHLÆUS Fab.

- H. cavus** Lec. G. d., rare (W); predaceous in "Xyleborus" galleries.
H. parallelus Mels. Throughout the State III-VI, IX, in galleries of "Tomicus" under pine bark.
H. thoracicus Mels. Palisades VI, 28 (Lv); Boonton III, 3, Big Timber Creek XI, 19 (GG); g. d. rare (W); in Scolytid galleries in pine and cedar.

BOLETOTHERUS Cand.

- B. bifurcus** Fab. Common throughout the State on tree fungus (Boletus).

BOLETOPHAGUS Ill.

- B. corticola** Say. Ft. Lee Dist. (Bt); Hudson Co. (Ll); Riverton IV, 10 (GG); Seaville IV, 29, VI, 11 (Brn).
B. depressus Rand. Hudson Co. (Ll); g. d. (W).

HELOPS Fab.

- H. micans** Fab. Locally common throughout the State under bark.
H. americanus Beauv. G. d., rare (W).
H. venustus Say. Atlantic City (Castle); g. d., rare (W); on dead oak.
H. gracilis Bland. Woodbury IV, Newtonville VI (Brn); Clementon IV, V (div); Lakewood and Lakehurst V-VII (div); Da Costa V, Atlantic and Cape May Cos., rare on pines (W).
H. æreus Germ. Throughout the State, fall to spring; locally common.

MERACANTHA Kirby.

- M. contracta** Beauv. Hopatcong (Pm); Greenwood Lake (Bt); Staten Island VII (Ds); g. d., rare (div); on old, dead trees.

STRONGYLUM Kirby.

- S. tenuicolle** Say. Ft. Lee (Bt); Hudson Co. (Ll); Newark Dist. (Bf); Woodbury VII, Merchantville V (Brn).
S. terminatum Say. New Jersey, probably Plainfield (Sf).

Family CISTELIDÆ.

In general structure like the preceding, but with longer, more slender antennæ and generally smooth, pubescent surface. They are usually brown in color with none or only confused maculation, very convex upper surface, often tapering to a point posteriorly.

They are found on leaves, flowers and under bark, the larvæ so far

as known living in rotten wood and somewhat resembling wire-worms in shape. None are of economic importance.

LOBOPODA Sol.

- L. punctulata* Mels. DaCosta VII, 30 (Dke); Clementon V, Atlantic City VI, Seaville VI (Brn); Anglesea VII (Sz); g. d., rare (W); on dry twigs.
- L. atra* Say. Ft. Lee (Sf); Orange Mts. (Bf); Staten Island (Lg); Atco (Li); Glassboro VII, DaCosta VI, VII, Sea Isle VI (Brn); Iona VII (Dke).

HYMENORUS Muls.

- H. niger* Mels. Eagle Rock VII, Merchantville VI (GG); Woodbury VIII (Brn); Anglesea (W); g. d. (Li).
- H. pilosus* Mels. Merchantville VI, 15 (Brn); Anglesea (W).
- H. obscurus* Say. Greenwood Lake VI, 21 (Lv); Collingswood VI, 10 (GG); Anglesea, g. d. (W); all the species on dead branches.
- H. discretus* Casey. Fort Lee (Sf).
- H. rufipes* Lec. Caldwell (Cr).

MYCETOCHARA Berth.

- M. haldemani* Lec. Snake Hill, rare (Bf).
- M. fraterna* Say. Orange Mt. Dist. V, VI (div); New Jersey (Horn); all the species on dead wood.
- M. binotata* Say. Ft. Lee VII (Sf); Orange Mts. VI, 17 (Bf); Staten Island (Lg); Avalon VI, 23 (Brn).
- M. analis* Lec. New Jersey (Casey).

ISOMIRA Muls.

- I. quadristriata* Coup. Hopatcong (Pm); Orange Mts., common on dogwood (Bf); g. d. common (W).
- I. valida* Sz. Anglesea, on dead holly branches (W).
- I. ruficollis* Hamilton. 5-mile beach V, 30 (W).

CAPNOCHROA Lec.

- C. fuliginosa* Mels. Hopatcong (Pm); Caldwell (Cr); Orange Mts. (Bf); Newark (Soc); Highlands VII (Sf); g. d. (W).

CISTELA Fab.

- C. brevis* Say. G. d., rare (W); the species generally on flowers.
- C. sericea* Say. Common, VI, VII, throughout the State.

ANDROCHIRUS Lec.

- A. erythropus* Kirby. (*fuscipes* Mels.) Hopatcong (Pm); g. d., not common (W).

Family LAGRIIDÆ.

Represented in our fauna by only two economically unimportant species. Head and thorax narrow, of about equal width, nearly cylindrical, the elytra abruptly broader so as to form distinct shoulders. The colors are black or bronzed and the texture of the wing covers is decidedly thin and somewhat flexible. The adults are found on flowers, leaves or under bark of trees, never common, while the larvæ are credited with predatory tendencies.

ARTHROMACRA Kirby.

A. ænea Say. Del. Water Gap VII, 12 (Jn); Hopatcong (Pm); Greenwood Lake VI, 21 (Lv); Ft. Lee VI (Bt); Orange Mts. (GG); Atlantic, Cape May Cos. (div).

STATIRA Latr.

- S. gagatina* Mels. Throughout the State, on flowers or under bark; usually rare.
- S. resplendens* Mels. Staten Island (Lg). Replaces "croceicollis" of the last edition.

Family MELANDRYIDÆ.

The beetles of this family also are economically unimportant, and have the same general habits as in the immediately preceding families. They are very diverse in form but usually slender, often elliptical in outline, in general densely clothed with fine silky hair or pubescence, the antennæ moderate in length, palpi often very long. The head is hidden as far as the eyes, and the prothorax is nearly or quite as broad at base as the elytra. They are feeders in wood, fungi and dry vegetable matter generally. The larvæ are of the usual slender cylindrical form, the head thorax and tail segments chitinized.

TETRATOMA Fab.

- T. truncorum* Lec. Westville (Li); in old fungus (W).
- T. tessellata* Mels. Hopatcong (Pm); Ft. Lee (Bt); Hudson Co., Woodside (Bf); Staten Island (Lg); 5-mile beach (W); on fungus on dead branches V-VIII.

PENTHE Newm.

- P. obliquata* Fab. Throughout the State under bark, sometimes common.
- P. pimelia* Fab. With the preceding, usually more rare.

SYNCHROA Newm.

- S. punctata* Newm. Throughout the State V, VI, under bark of deciduous trees and on dry limbs; locally common.

PROTHALPIA Lec.

- P. undata** Lec. Greenwood Lake VI, 22 (Lv); Hemlock Falls V, 31 (W); Newark and Orange Mt. Dist. (div); in fungus on dead branches.

MELANDRYA Fab.

- M. striata** Say. Throughout the State, locally common, V, VI; under bark and on fungus in rotten trees.

EMMESA Newn.

- E. labiata** Say. Ft. Lee (Sm); Woodside (Bf); Highlands V, 30 (Sf); rare.

AMBLYCTIS Lec.

- A. præses** Lec. "Have a specimen of this very rare species from Moshulu, N. Y., and should also occur in New Jersey" (Sf).

"*Xylita lævigata*" is an error of determination.

ZILORA Muls.

- Z. nuda** Prov. Eagle Rock VII, rare (Bf).

CAREBARA Lec.

- C. longula** Lec. Jamesburg VI, 24, Lakehurst V, 29 (Jl); Woodbury VII, 7 (Brn); Bamber VI, 3 (W).

SPILOTUS Lec.

- S. quadripustulosus** Mels. Orange Mts. VI (Bf); Staten Island, on sour gum (Thompson); Anglesea V, 30 (W).

SCOTOCHROA Lec.

- S. atra** Lec. Newark, on dry branches, rare, all summer (Bf).

SERROPALPUS Hellw.

- S. barbatus** Schall. Orange Mt. Dist., at light and from dry fungus VI (div); Anglesea V, 30 (W).

HYPULUS Payk.

- H. voudoueri** Mels. Orange Mts., rare (Bf).

PHLÆOTRYA Steph.

- P. simulator** Newn. Newark, Orange Mts., rare (Bf).

- P. liturata** Lec. Throughout the State VI, VII, on dead, fungus-covered branches; sometimes rather common.

- P. voudoueri** Muls. Hopatcong (Pm); Greenwood Lake, Ft. Lee (Bt).

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SYMPHORA Lec.

S. flavicollis Hald. Greenwood Lake VII (Sf); Orange Mts. V, 30, Newark (Bf); Staten Island (Lg); Highlands VI (Ch); Atco, Anglesea (W).

S. rugosa Hald. With the preceding; neither species rare.

ANISOXYA Muls.

A. glaucula Lec. Orange Mts. (Bf); Newark (Soc); Atco (W); Anglesea VII (Sz).

HOLOSTROPHUS Horn.

H. bifasciatus Say. (*Eustrophus*) Throughout the State IV, VI, IX; found in rotten wood.

EUSTROPHUS Ill.

E. bicolor Say. Throughout the State IX until next VI; not rare.

E. tomentosus Say. Hopatcong (Pm); Westville (Li).

HALLOMENUS Panz.

H. scapularis Mels. Orange Mts., Newark (div).

ORCHESIA Lat.

O. castanea Mels. Ft. Lee (Sf); Newark (Bf); Iona VI, 22 (Brn); Anglesea VII (Sz); g. d. (W); in hard fungi on trees.

O. gracilis Mels. Orange Mts. (Bf); Staten Island (Lg).

MICROSCAPHA Lec.

M. clavicornis Lec. Ft. Lee VII (Sf); Highlands VI, VII (div).

SCRAPTIA Lat.

S. sericea Mels. Newark (Soc); DaCosta, Buena Vista (Li); on blossoms.

ALLOPODA Lec.

A. lutea Hald. East Jersey (Dietz); DaCosta, Buena Vista (Li); Berlin VI, Newtonville VI, Iona VI, Sea Isle VII (Brn); Anglesea (W).

CANIFA Lec.

C. plagiata Mels. Buena Vista (Li).

C. pusilla Hald. Orange Mts. V, 30, Newark (Bf); Atco (W).

C. pallipennis Lec. Atco (W); all species on flowers.

C. pallipes Mels. Hopatcong (Pm); Newark (Loeffler); Westville to Brigantine, g. d., V, 27-VII, 25 (Brn).

NOTHUS Oliv.

N. varians Lec. Anglesea (W).

MYCTERUS Clairv.

M. scaber Hald. Hudson Co. (Ll); Westville VI, Malaga VII (GG); Iona VI (Brn); Manumuskin VI, 23 (Dke); not rare.

Family **PYTHIDÆ**.

Generally resemble the "Melandryidæ" in habits and structure, but have the prothorax narrowed behind, the elytra forming distinct shoulders, and there may be either a deep central or lateral depressions on the upper side. In form they are long and narrow, very much flattened or only a little convex. Only four innoxious species occur with us.

BOROS Hbst.

B. unicolor Say. Riverton IV (div); Malaga V, VI (div); Palmyra V (Jn); Gloucester IV, Iona VI (Brn); Lakehurst IV (Ds); under pine bark.

PYTHO Latr.

P. planus Oliv. (*americanus* Kirby) Palisades, under pine bark (div); Palmyra III (Jn).

SALPINGUS Gyll.

S. virescens Lec. Ft. Lee (Sf); Orange Mt. Dist., at light (div); Sea Isle VI, 10 (Brn).

RHINOSIMUS Latr.

R. viridiæneus Rand. Highlands, beating oak (Sf)

Family **ÆDEMERIDÆ**.

Long, slender, cylindrical or semi-cylindrical beetles, rarely a little flattened, the head and thorax narrower throughout than the elytra, the latter soft in texture or with fine punctures and silky hair. The antennæ are long and slender, and the feet have the penultimate joint deeply bilobed or cleft. They are found on flowers, foliage and sometimes in crevices of logs, trees or stumps. The larvæ have the slender form general in this series, but the head is broader than usual. None of them are in any way harmful.

MICROTONUS Lec.

M. sericans Lec. Throughout the State V-VII; not common.

NACERDES Schm.

N. melanura Linn. Throughout the State V-VII; not rare in cities in woodsheds or about cellars; more common along the coast. The species is an imported one and cosmopolitan.

XANTHOCHROA Schm.

X. lateralis Mels. Hopatcong (Pm); Newark (Soc). Not recently taken.

ALLOXACIS Horn.

A. dorsalis Mels. Common along shore from Sandy Hook to Cape May V-VIII, in or under wet boards, timbers, etc.

COPIDITA Lec.

C. notoxoides Fab. Buena Vista (Li); Atco DaCosta (W); Lahaway VI, 1, on flowers (Sm); Newtonville, VI, Brigantine VII, Ocean City VII (Brn).

C. thoracica Fab. With the preceding, more common and somewhat more widely distributed, but in the same general regions.

C. suturalis Horn. Anglesea (W).

ASCLERA Schm.

A. ruficollis Say. Throughout the State; common on willow catkins.

A. puncticollis Say. Staten Island (Lg); Clementon IV, V (div); Sea-ville IV (Brn).

OXACIS Lec.

O. tæniata Lec. Anglesea (Li).

Family **CEPHALOIDÆ.**

The single species that occurs in the State resembles at first sight the longicorn genus "*Leptura*," but is more slightly built, with more slender legs and antennæ. It occurs on dry branches and is rare.

CEPHALOON Newn.

C. lepturoides Newn. Hopatcong (Pm); Greenwood Lake VI (Bt); Boonton VI (GG); Orange Mt. Dist., g. d. VI (div).

Family **MORDELLIDÆ.**

Small, usually wedge-shaped beetles, covered with fine silky hair, which, on the black species, sometimes forms lines, bands or spots on the upper side. The hind legs are usually long and stout, fitted for leaping. The abdomen is produced into a more or less obvious style or pointed process, the antennæ are long and slender, and the thorax is as wide at base as the elytra. They are found on flowers or on dead trees, and are sometimes brightly colored and banded. Most of them are locally common, and dozens of them may often be taken from a single cluster of "*Spirææ*" blossoms.

The larvæ are long and slender, and live in dead wood or the pith of plants. None are of economic importance.

PENTARIA Muls.

P. trifasciata Mels. Gloucester V, 10, g. d. (W); Westville VII, 7 (Brn).

ANASPIS Geoffr.

A. flavipennis Hald. Hopatcong (Pm); Orange Mts. (Bf); Staten Island (Lg); Riverton V, 14 (GG); Seaville IV, 29 (Brn).

A. rufa Say. Throughout the State V-VII; locally very common.

TOMOXIA Costa.

T. bidentata Say. Snake Hill (Sf); Caldwell (Cr); Orange Mts. V, 26 (Bf); on dead trees; nowhere common.

T. lineella Lec. Hopatcong (Pm); Boonton VIII, 16 (GG); Millburn (Bf); Middlesex Co. VII, 20 (Sm); Atco V, 28 (W); on dead trees; rare.

T. inclusa Lec. Snake Hill (Sf).

MORDELLA Linn.

M. melæna Germ. Caldwell (Cr); Orange Mts., New Brunswick VII, Jamesburg VII (Sm); Glassboro VII, 30 (GG).

M. scutellaris Fab. Common throughout the State VI-VIII.

M. octopunctata Fab. Snake Hill (Sf); Newark Dist., rare (Bf); Jamesburg VII, 4 (Dke); Collingswood VII (GG); Gloucester, Camden Co., rare, Anglesea VI, common (W).

M. lunulata Helm. New Brunswick VII, 20, So. Amboy VI, 8 (Coll).

M. marginata Mels. Throughout the State VI-VIII; common.

M. serval Say. Lake Hopatcong (Pm).

M. triloba Say. Orange Mts. (Bf); Atco VII, 15 (W).

M. discoidea Mels. Caldwell (Cr); Orange Mts. (Sm); Gloucester VII, 2 (W); Westville VII, 7 (Brn); Glassboro VII, 19 (GG); always rare.

MORDELLISTENA Costa.

M. arida Lec. Atco V, 14 (W).

M. trifasciata Say. Hopatcong (Pm); Orange Mts. (Bf); Gloucester VII, VIII (W); W. Berlin VI, 25 (Brn).

M. lepidula Lec. Orange Mts., New Brunswick VII (Sm); Westville, Atco VI, Iona VI (Brn); not common.

M. limbalis Mels. Orange Mts., rare (Sm).

M. vapida Lec. Orange Mts. (div).

M. fulvicollis Mels. Orange Mts. (Sm).

M. ornata Mels. Hopatcong (Pm); New Jersey (Sf).

M. militaris Lec. Orange Mts. VI, 26, VII (div).

M. scapularis Say. Orange Mts. VI, VII (div).

M. comata Lec. Throughout the State VI, VII; locally common.

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- M. aspersa* Mels. The most universally common species of the genus.
M. amica Lec. Orange Mts., rare (Bf).
M. picilabris Helm. Atlantic City VI, 24 (Brn).
M. infima Lec. Westville VI, Atco V, 29, DaCosta VII, 5 (Brn).
M. andreae Lec. Anglesea V, 27 (Sm).
M. ancilla Lec. DaCosta VI, 12 (Brn); g. d., not common (W).
M. varians Lec. Orange Mts., common (Sm); Westville VI, VII (div); Brigantine Beach IX (Hn).
M. ustulata Lec. Newark, Orange Mts., rare (Bf); Anglesea VII, 11 (Brn).
M. impatiens Lec. Orange Mts., Newark VI, VII (div); DaCosta VI, 24, Anglesea V, 31 (Brn).
M. nigricans Mels. Throughout the State V-VII; locally common.
M. ruficeps Lec. DaCosta VII, 5 (Brn); New Jersey (Sm).
M. splendens Sm. Sea Isle VIII, 14 (Brn); Anglesea VIII, IX (div).
M. pustulata Mels. Throughout the State V-VII; common.
M. fuscipennis Mels. Near Hoboken (Sm).
M. morula Lec. Staten Island (Lg); New Brunswick VII (Sm); Westville, DaCosta VII, 2-30 (Brn).
M. ambusta Lec. Orange Mts. (Bf); Lahaway VI, 1 (Sm).
M. unicolor Lec. Orange Mts. VII (Sm); Woodbury VI, 13 (GG); DaCosta VI, 3 (Brn); Anglesea and g. d. VII (W).
M. marginalis Say. Newark, Orange Mts. VI, VII (div); Gloucester VI, 17, Anglesea VII, 6 (W).
M. pubescens Fab. Throughout the State VI, VII; not rare.
M. bihamata Mels. Newark (Soc).
M. liturata Mels. Orange Mts. (Bf); Lahaway VI (Sm); Anglesea VII (Sz).
M. fuscata Mels. Orange Mts., VII, rare (Sm).
M. cinereofasciata Sm. Westville VII, 2, Atco VII, 17 (Brn).

Family ANTHICIDÆ.

Small or moderate sized species, varying much in form, often brightly or contrastingly colored or banded, the thorax narrower than the elytra and sometimes peculiarly modified, the antennæ long and slender. They live under varying conditions, some of them in sand, often resembling ants in appearance and running rapidly when turned out of their burrows. None of them are injurious to cultivated plants.

CORPHYRA Say.

- C. funebris* Horn. Newark (Bf); along shore in wash-up, rare (W).
C. elegans Hentz. Suffern, V, 30, common (Sf); Caldwell (Cr).
C. terminalis Say. Newark, V, 29, rare (Bf).
C. newmani Lec. Orange Mts. VI, common (Ch).

- C. lugubris* Say. Suffern V, 30, common; sure to occur in New Jersey (Sf).
C. collaris Say. Boonton VI, 11 (GG); Caldwell (Cr); Orange VI (Ch); along shore in wash-up, not rare (W).

MACRATRIA Newn.

- M. murina* Fab. Clifton VII, 3, Burlington Co. VI, 4, Merchantville VI (GG); Westville VII, 4 (Brn); Ocean Co., common (Sm); g. d. on willow (W).

TOMODERUS Laf.

- T. interruptus* Laf. Newark, edge of meadows in early spring; Merchantville IX, 26, DaCosta VI, 3 (Brn).
T. constrictus Say. Newark (Dn); salt meadows (Bf); Gloucester, Westville, Laurel Springs V, 10-28 (Brn).

MALPORUS Casey.

- M. formicarius* Laf. (*Anthicus*) Merchantville IV (Brn); seashore, Brigantine to Cape May V, VII, IX (div).
M. cinctus Say. (*Anthicus*) Arlington (Bf); Staten Island XI, 16 (Jl); Anglesea VII (Sz).

LAPPUS Casey.

- L. obscurus* Laf. Arlington VI, 21 (Sf).

THICANUS Casey.

- T. rejectus* Lec. (*Anthicus*) Brigantine IX (Hn); Anglesea VII, 11 (Brn).

HEMANTUS Casey.

- H. floralis* Linn. (*Anthicus*) Ft. Lee (Bt); Newark (Soc); Gloucester V, 27 (Brn); Anglesea VII (div); and probably throughout the State.

ANTHICUS Payk.

- A. ephippium* Laf. (*difficilis* Lec., *confusus* Lec.) Throughout the State all winter and until VII, 10.
A. scabriceps Lec. Newark (Bf).
A. cervinus Laf. Union, early spring at base of trees (Bf); Woodbury V-VII (div); Westville V, Sea Isle VI, Avalon VII (Brn); seashore (W); not rare.
A. haldemani Lec. Orange VI, at light (Ch).
A. melancholicus Laf. (*spretus* Lec.) Westville V, 28, DaCosta VII, 5, Sea Isle V, 10 (Brn); Anglesea VI, VII (div).

SAPINTUS Casey.

- S. pubescens* Lec. (*Anthicus*) Collingswood III, 12 (GG); New Jersey (Dn).
S. fulvipes Laf. Newark II, 12, Arlington, salt meadows, common (Bf); Anglesea IV, 28 (Brn).

AMBLYDERUS Laf.

- A. pallens* Lec. Brigantine IX (Hn); Anglesea V, VII (div); seashore, not rare (W).

NOTOXUS Geoffr.

- N. bicolor* Say. Throughout the State IX until following VI; common.
N. bifasciatus Lec. Orange VI (Ch); Newark Dist. (Bf); Clifton, Dunellen (Coll); Newtonville VI, 19 (Brn); Atco (div); locally common.
N. anchora Hentz. Hopatcong (Pm); Ft. Lee, Dunellen (Dietz); Newark at light (Bf); Ocean Co. (Sm); not common anywhere.
N. monodon Fabr. Common throughout the State, all season.
N. delicatus Casey. Brigantine Beach IX (Hn).
N. planicornis Laf. Sea Isle VI (Brn); Anglesea throughout the season, most abundant sweeping in the early evening.

MECYNOTARSUS Laf.

- M. candidus* Lec. Westfield (Jl).
M. flavicans Casey. Hackensack V (Bf); Westville (Li); Merchantville V (Brn); g. d. near Delaware River in white sand (W); nocturnal.

ELONUS Casey.

- E. basalis* Lec. Widely distributed and should occur in New Jersey (Sf).
E. nebulosus Lec. Madison VII, 16 (Pr); Orange Mts. (Bf).

EMELINUS Casey.

- E. melsheimeri* Lec. Ft. Lee (Jl); Highlands VII, on hickory (Sf).

ZONANTES Casey.

- Z. signatus* Hald. Newtonville III, 26, one example (Brn).
Z. subfasciatus Lec. Highlands IV, V, VII, under stones (Sf); Jamesburg VII (Bf).
Z. fasciatus Mels. (*Xylophilus*) Orange Mts. VIII (Bf); Highlands VII, 8, beating (Sf); Lakehurst VII, 12 (Jl); not rare.
Z. tricuspidis Casey. Orange Mts. VII (Sf).
 The "*Xylophilus quercicola*" of the last edition is an error.

Family PYROCHROIDÆ.

Rather large, flattened beetles, bright blue, black or orange in contrast, thorax narrower than the elytra, the latter rather soft in texture, widening posteriorly. The antennæ are either serrate or, in the males, with long comb-like processes. The beetles are usually rare, found about dead or decaying trees, and in these live the larvæ, which have a broad head, stout legs and two spines on the last abdominal segment. None are of economic importance.

ISCHALIA Pasc.

- I. costata* Lec. Woodbury XII, Merchantville (W); Lakehurst V (Jl); in each case by sifting moss or old leaves in a swamp.

PYROCHROA Geoff.

- P. flabellata* Fab. Hopatcong (Pm); Greenwood Lake VI, Ft. Lee (Bt); Caldwell (Cr); Orange Mts., g. d. (Bf); Sea Isle VII, 4 (Brn).
P. femoralis Lec. Greenwood Lake, Ft. Lee (Bt); g. d., rare (W).

DENDROIDES Latr.

- D. canadensis* Latr. Hopatcong (Pm); Palisades VII, bred (Lv); Caldwell (Cr); Orange Mts., West Bergen, under bark (Bf).
D. concolor Newm. Snake Hill V (Wintersteiner).

Family MELOIDÆ.

Contains the "oil beetles" and "blister beetles." They are soft in texture, usually slender and cylindrical, the thorax narrower than head or elytra, the antennæ sometimes curiously knotted or otherwise modified in the male, the insects as a whole loose-jointed and sprawly in appearance. They vary in color, are often striped and spotted and sometimes metallic. In the adult stage they feed on plant tissue and are sometimes distinctly injurious. One of them, known as the "old-fashioned striped potato beetle," frequently comes in late summer, sometimes with, sometimes replaced by an ally, and it or they sweep through a field or garden before the grower realizes the nature of the attack. They attack not only potatoes, but beets and a great variety of other plants and flowers, and as a rule disappear almost as suddenly as they come. Some species remain for a day or two only; others stay for a week or two, and these, when they attack cultivated plants, should be collected in kerosene pans or driven by means of lime or other repellants, as may be indicated. Arsenites kill them slowly and will not be effective until they have done nearly or quite all the injury that they would have caused without treatment.

Curiously enough, quite a number of the species are markedly beneficial in the larval stage, being among the most important checks to grass-

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hopper increase. Others are semi-parasitic in the nests of bees, and are at least not beneficial, even if not directly harmful.

In New Jersey they are not as important as they are in some of the Western States, and the injuries caused by them warrant active measures for their destruction.

MELOE Linn.

M. angusticollis Say. Madison (Pr); Caldwell (Cr); g. d., in late fall on wild turnip (Bf); Riverton XI, 5 (Dke).

M. americanus Leach. Orange Mts., Irvington XII, 30, under stones (Bf); Newark (Soc).

NEMOGNATHA Ill.

N. nemorensis Hentz. Dunellen (Dietz); DaCosta VII, 28 (Dke).

ZONITIS Fab.

Z. bilineata Say. Snake Hill (Sf); Madison VIII, 4 (Pr); Orange Mts. (Bf); Staten Island (Lg).

MACROBASIS Lec.

M. unicolor Kirby. Throughout the State VI, VII, often common on "Baptisia tinctorum"; sometimes on potatoes.

EPICAUTA Redt.

E. trichrus Pall. East Jersey (Dietz); Merchantville VII, 19, Glassboro VII, 17; on sweet potato, "Convolvulus" sp., and "Maruta cotula."

E. strigosa Gyll. Bamber VIII, 11 (Dke).

E. batesii Horn. Lakehurst VII, VIII (div).

E. vittata Fab. Throughout the State, often destructive in late summer to potatoes and other garden crops and to flowers; is the "old-fashioned striped potato beetle."

E. marginata Fab. With "cinerea," and usually regarded as a variety.

E. cinerea Forst. Throughout the State VIII; habits of "vittata," but not so abundant nor so often injurious.

E. pennsylvanica De G. Throughout the State VIII, IX; common on Solidago.

POMPHOPCEA Lec.

P. ænea Say. Woodside (Bf); Merchantville VIII (Brn); Westville (Li); Anglesea (W); in early spring; isolated specimens only.

P. sayi Lec. Greenwood Lake VI (Beyer).

Fig. 149.—The "Spanish fly," *Lytta vesicatoria*: not a native of this country.

Fig. 150.—The "striped blister beetle," *Epicauta vittata*.

Fig. 151.—Early stages of blister beetles: *a*, grasshopper egg-pod with triungulin at *f*; *b*, grasshopper eggs, enlarged; *c*, triungulin; *d*, carabidoid stage of larva; *e*, scarabidoid stage of larva, enlarged.

Fig. 152.—Striped blister beetle: *a*, scarabidoid larva; *c*, *d*, coarctate larva, enlarged.

Fig. 153.—Striped blister beetle: *a*, *b*, true pupa from side and beneath, enlarged.

Fig. 154.—Margined blister beetle, *Epicauta cinerea*.

Fig. 155.—Ash gray blister beetle, *Macrobasis unicolor* at *a*; black blister beetle, *Epicauta pennsylvanica* at *b*, enlarged.



Fig. 149.

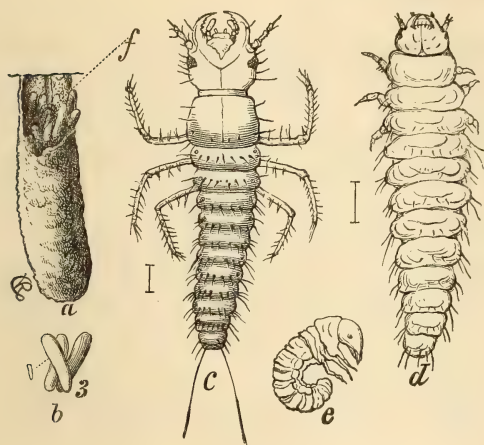


Fig. 151.



Fig. 150.



Fig. 154.

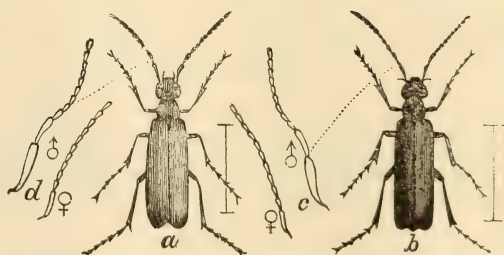


Fig. 155.

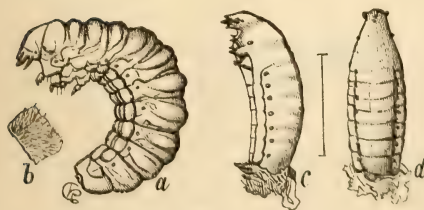


Fig. 152.

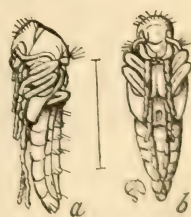


Fig. 153.

Family RHIPIPHORIDÆ.

Contains wedge-shaped or clumsy, almost shapeless, forms, with short, sometimes pointed wing-covers, beyond which the hind wings often project so as to cover the abdomen. The head is bent down, the antennæ are serrated in the female, flabellate in the male. The adults occur on flowers, rarely, the larvæ are semi-parasitic in nests of wasps or on cockroaches.

PELECOTOMA Fisch.

P. flavipes Mels. New Jersey (Sf).

RHIPIPHORUS Fab.

R. flavipennis Lec. Glassboro VII (GG); Anglesea VII (Brn); g. d., rare (W), Iona VII, 13 (Dke).

R. dimidiatus Fab. Throughout the State VI, VII, rare.

R. octomaculatus Gerst. Malaga VIII, 4 (GG).

R. pectinatus Fab. Throughout the State VI, VII; rare.

R. limbatus Fab. Throughout the State VI, VII; rare.

R. limbatus Fab. Palisades VII, 26 (Lv); Orange Mts., Newark (Bf); Merchantville VII, 17, Farmingdale VII, 18 (GG); g. d., rare (W).

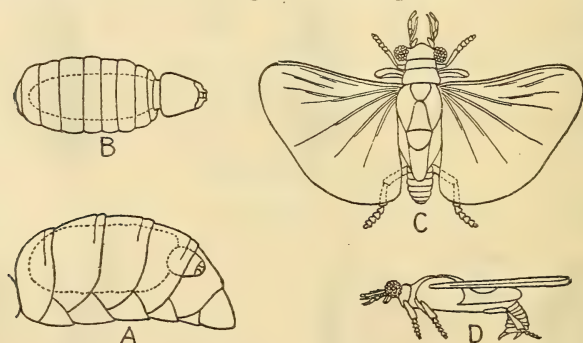
R. linearis Lec. Madison VII, 17 (Pr).

MYODITES Latr.

M. fasciatus Say. Orange Mts. (Bf); East Jersey, rare (Dietz).

Family STYLOPIDÆ.

This family is represented in our State by a single minute species only, so far as our collections go. It is a representative of a very curious



Stylops and its development: *a*, female in body of bee; *b*, same in outline; *c*, *d*, male from above and side.

Fig. 156.

little group, which is given ordinal rank by some who have studied it most closely, and I believe that conclusion to be warranted. As matter

of convenience, however, and because the change has not been generally adopted in our lists, I have preferred to leave the species here. The male only is winged, the female lives in the abdomen of some of our paper-making wasps.

XENOS Rossi.

X. peckii Kirby. Occurs very rarely throughout the State in the abdomen of the species of "Polistes."

Series RHYNCHOPHORA.

The remaining families of the order belong to the so-called "snout-beetles" or weevils, sometimes classed as a sub-order. The chief obvious character of a great majority of the species is the elongated head or snout, at the end of which the minute mouth parts are situated. In some cases this snout is very much reduced; but in such types the tendency is to a cylindrical form, and the pro-thorax has no lateral margin or suture. Practically all the species are feeders upon vegetable tissue, and many of them are injurious or even destructive to cultivated crops. The families of this series are not easily distinguished except by the use of rather obscure structural characters, and no definitions will be attempted except in special instances—e. g., the "Scolytidæ."

The larvæ are white, very much wrinkled, stout, fleshy grubs, usually without legs, with a yellowish head and a tendency to curl or assume the position of a "white-grub." They also are vegetable feeders, attacking plants in all parts, and many of them rank as first-class pests.

Family RHINOMACERIDÆ.

RHINOMACER Fab.

- R. pilosus** Lec. Gloucester, rare on dying pine (W); Westville IV, Newtonville III, 26 (Brn); Clementon V, 5, (GG); Iona V, 16 (CG).
R. elongatus Lec. Morristown on pine (Jül); Gloucester (W); Westville (Li); Merchantville IV, 27 (Brn); Clementon V, 5 (GG); Iona V, 16 (CG).

Family RHYNCHITIDÆ.

AULETES Sch.

- A. ater** Lec. Ramapo Mts. V, 27, on "Myrica" (Sf); Ft. Lee on sweet fern (Jül); Landisville, DaCosta (Li); Newtonville VI, Sea Isle V (Brn); Anglesea (W).
A. subcræuleus Lec. Newark, one specimen (Bf).
A. cassandræ Lec. Orange Mts. (Bf); Atco, DaCosta VII (Brn); Buena Vista (Li); Anglesea V, 28 (W).

EUGNAMPTUS Sch.

- E. angustatus** Hbst. Throughout the State V-VII on oak, hickory, butternut, chestnut, sycamore, etc.; not rare.
- E. collaris** Fab. Also throughout the State on oak, more local than the preceding, and locally no less abundant.

RHYNCHITES Hbst.

- R. bicolor** Fab. Common throughout the State VI-VIII on rose.
- R. æneus** Boh. Lake Hopatcong (Sf).
- R. hirtus** Fab. Throughout the State V-VII, on oak; not common.
- R. fossifrons** Lec. Orange Mts., rare (Bf).
- R. cyaneus** Lec. Highlands, abundant (Ch).
- R. æratus** Say. Throughout the State V-VII, on oak; not rare.

PTEROCOLUS Sch.

- P. ovatus** Fab. Throughout the State, V, VI, on oak, locally and seasonally common; more abundant on the scrub oaks of South Jersey.

Family ATTELABIDÆ.

ATTELABUS Linn.

- A. analis** Ill. Throughout the State VI, VII on sumac; makes little cases in which the eggs are deposited.
- A. nigripes** Lec. Throughout the State V-VIII; on oak; more common in So. Jersey on scrub oak.
- A. bipustulatus** Fab. With the preceding and hardly less common.
- A. rhois** Boh. Chester, Newark (Bf); Orange Mt. Dist. (div); New Brunswick VII, Jamesburg VII, Anglesea V, VII (Sm); on hazel and sumac.

Family OTIORHYNCHIDÆ.

EPICÆRUS Sch.

- E. imbricatus** Say. Throughout the State, rare; in some localities this imbricated snout beetle has been known as injurious, but I have never found it so in New Jersey.

HORMORUS Horn.

- H. undulatus** Uhler. Hoboken (Jül); Newark Dist., g. d., under stones in early spring, always rare (Bf).

ANAMETIS Horn.

- A. granulatus** Say. (grisea Horn.) Newark (Soc); lives under bark of apple and pear (Riley).

PANSCOPUS Sch.

- P. erinaceus** Say. Salt meadows III, 19 (Bf); Woodbury III, 25, sifting old leaves (W); on wild grape VI, VII (Sm).

PHYXELIS Sch.

- P. rigidus** Say. Hopatcong (Pm); Madison (Pr); Weehawken (Bt); Newark Dist. (Bf); Camden (Li); Collingswood VII (Brn); g. d. (W).

AGRAPHUS Sch.

- A. bellicus** Say. Hopatcong (Pm); Newark (Soc); Sandy Hook (Bf); Shrewsbury (Jül); Anglesea (W); always rare.

OTIORHYNCHUS Germ.

- O. sulcatus** Fab. North of Piedmont Plain, not rare; South Jersey, under hemlock bark (W).
O. ovatus Linn. Throughout the State, locally common; larva is the "strawberry crown girdler"; beetle is a general feeder.
O. rugifrons Gyll. East Jersey (Dietz); Ft. Lee V, under stones (Bf).

CERCOPEUS Sch.

- C. chrysorrhæus** Say. Delaware Valley and northward in early spring, under bark of chestnut and other trees and stumps.

PACHNÆUS Sch.

- P. distans** Horn. Manumuskin VI, 21 (Dke).

TANYMECUS Sch.

- T. confertus** Gyll. Throughout the State, under stones in spring and until VII, feeding on a great variety of plants.

PANDELETEJUS Sch.

- P. hilaris** Hbst. Throughout the State, common, in white oak and beech.

BRACHYSTYLUS Sch.

- B. acutus** Say. Newark (Soc); South Jersey (W); only on persimmon.

ARAMIGUS Horn.

- A. fulleri** Horn. "Fuller's rose beetle." An imported species, which was for a time a serious pest in rose-houses in Union County and elsewhere. It was never abundant outdoors and is rarely found now even in green-houses, where they have learned how to deal with it.

APHRASTUS Sch.

- A. tæniatus** Gyll. Common throughout the State on hazel, alder and other bushes in July.

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The "*Plinthodes tæniatus*" of the last edition really refers to this species.

POLYDROSUS Sch.

P. dorsalis Horn. (*Cyphomimus*) Ft. Lee, on wild cherry (Jül); Hudson Co. (Li); rare.

SCIAPHILUS Steph.

S. asperatus Bonsd. Hopatcong (Pm); Orange Mts. VIII, not rare (Bf).

BARYPITHES Duval.

B. pellucidalis Boh. Orange Mts., early spring, not rare (Bf).

STROPHOSOMUS Steph.

S. coryli Fab. Orange Mts., on birch, "*Betula lenta*" (Jül).

Family CURCULIONIDÆ.

SITONES Sch.

S. hispidulus Germ. Throughout the State V-X, the larva on roots of clover. While this is sometimes locally common, it has never occurred in such numbers as to make it actually injurious.

S. flavescens Marsh. Hudson Co. (Li); salt meadows, in early spring (Bf); g. d. (W); and probably throughout the State, locally.

S. crinitus Oliv. New Jersey (Jül).

ITHYCERUS Sch.

I. nova-boracensis Forst. Throughout the State, not common; breeds in twigs of oak; also found on hickory and beech.

APION Hbst.

A. impeditum Fall. Newark district (Bf).

A. impunctistriatum Sm. Hemlock Falls (Bf); Anglesea (W); rare.

A. atripes Sm. South Camden (W).

A. finitimum Fall. Newark (Li); So. Camden (W).

A. melanarium Gerst. Hemlock Falls (Bf); New Brunswick VII (Sm); Camden VII, XII (div); Anglesea V (div).

A. minutum Sm. Gloucester (W).

A. pennsylvanicum Boh. Anglesea (Li), Newark Dist. (Bf), and probably throughout the State.

A. perminutum Sm. Camden and So. Camden X (div).

A. reclusum Fall. Anglesea (Li); one of the type localities.

A. coxale Fall. Snake Hill (Bf).

A. patrule Sm. Arlington meadows in early spring under stones (div); Anglesea V (div); in pods of climbing Legume (Ch).

- A. walshii* Sm. Jamesburg (W).
A. perforicollis Fall. DaCosta (W); Atco, Buena Vista (Li).
A. turbulentum Sm. Hopatcong (Pm); Arlington (Bf); New Jersey (Li); on "*Vaccinium stramineum*" (Hn); breeds in seeds of "*Meibomia*" (Ch).
A. griseum Sm. Throughout the State V-VII on "*Phaseolus*."
A. fraternum Sm. With the preceding; closely resembling but distinct from it; on the leaves of "*Lespedeza*" (Ch).
A. porcatum Boh. Newark Dist., rare in early spring on locust (Bf).
A. rostrum Say. Throughout the State south of the Highlands V-VII, on wild indigo, in the seeds of which it breeds.
A. nigrum Hbst. Hemlock Falls (Bf); Clifton, Orange V, VI (Ch); breeds in the seeds of the common locust, "*Robinia pseudacacia*."
A. oblitum Sm. Salt meadows (Bf); Camden XII, sifting (GG).
A. segnipes Say. Gloucester Co. (W); Anglesea V, 28 (Sm); probably throughout So. Jersey, in seeds of "*Tephrosia virginiana*."
A. decoloratum Sm. Camden, Gloucester Co., Cape May C. H. (W); South Jersey (Sm); breeds in seed pods of "*Meibomia*" (Ch).
A. emaceipes Fall. Probably confused with the preceding in collections.
A. carinatum Sm. Sure to occur in New Jersey.
A. spinipes Fall. DaCosta (W); Anglesea VII, 23 (div).
A. parallelum Sm. Buena Vista (Li); So. Jersey (W); not common.
A. puritanum Fall. Riverton V, Westville V, Clementon V (GG).
A. umboniferum Fall. South Jersey, probably.
A. herculanum Sm. South Jersey in "*Viburnum*" and "*Cornus*" Sp.

The last named three species are so closely allied that they are probably confused in collections.

PODAPION Riley.

- P. gallicola* Riley. Lakehurst VII, 7 (Bf); makes galls on "*Pinus inops*" and "*P. rigida*"; never common in this State.

PHYTONOMUS Sch.

- P. punctatus* Fab. The "clover-leaf beetle," common throughout the State VI-VII, but rarely injurious. The larva becomes full grown in May, but in ordinary seasons is nearly wiped out early in that month by a disease that prevents injury.
P. comptus Say. Hopatcong (Pm); Ft. Lee (Sf); Hudson Co. (Li); Newark Dist. (Bf); Westville IV, Gloucester Co. (div); on "*Polygonum*."
P. castor Lec. Mt. View (Bf); Lake Hopatcong (Gr).
P. nigrirostris Fab. Throughout the State IV-VII, locally not rare; common during the winter, sifting (W).



Fig. 157.—Diseased larva of clover leaf beetle, enlarged.

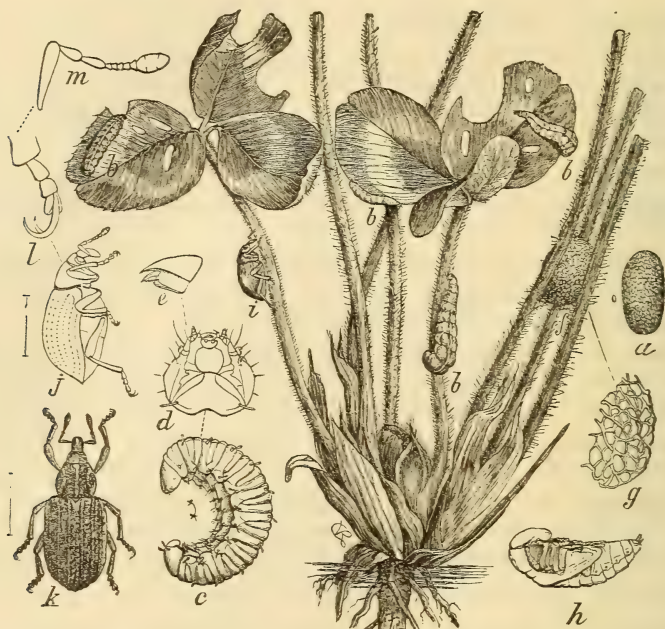


Fig. 158.—Clover leaf beetle, *Phytonomus punctatus*: a, egg, enlarged; b, b, larvæ feeding; c, larva, enlarged; d, e, head and mandible yet more enlarged; f, cocoon; g, same, enlarged to show its net-like character; h, pupa; i, beetle on clover stalk; j, beetle in outline from side; k, beetle, enlarged; l, m, foot and antennæ of beetle, yet more magnified.

LISTRONOTUS Jek.

- L. sordidus* Gyll. New Jersey, without definite locality. All the species whose habits are known feed on aquatic plants (Ch).
- L. tuberosus* Lec. Camden III, 3 (GG); Gloucester Co. (W).
- L. squamiger* Say. Orange VI (Ch); Newark Dist. (Bf); Gloucester (W).
- L. callosus* Lec. Hudson Co. (Ll); Arlington meadows IV, 9 (Bf).
- L. inæqualipennis* Boh. Hopatcong (Pm); Hudson Co. (Ll); Arlington, Newark, Waverly salt meadows III (Bf); Cramer Hill V, 30 (GG).
- L. caudatus* Say. Newark (Dn); Arlington meadows III, 17 (Bf).
- L. appendiculatus* Boh. Newark Dist. (Bf); Riverside VI, 20 (Brn); Camden IX, III (GG); Atco, Westville, common in winter, sifting (W).
- L. nebulosus* Lec. Eastern New Jersey (Dietz).
- L. frontalis* Lec. Hopatcong (Pm); Newark g. d. (Bf).
- L. latiusculus* Boh. Throughout the State; breeds in stalks and seed heads of "*Sagittaria variabilis*" (Ch). The "setosus" of last edition belongs here.
- L. teretirostris* Lec. New Jersey (Jül).

MACROPS Kirby.

- M. solutus* Boh. Newark, common on "Sagittaria" (Bf); Collingswood VII, 27 (GG); Camden, Gloucester Cos., in winter, sifting (W); g. d. (Li).
- M. indistinctus* Dietz. Irvington VI, 21, Newark (Bf); New Jersey (Dietz).
- M. delumbis* Gyll. Hopatcong (Pm); Newark Dist. VII, VIII (Bf).
- M. rotundicollis* Dietz. Irvington VI, 19 (Bf).
- M. sparsus* Say. Hopatcong (Pm); Bloomfield VIII, Newark Dist. (Bf); Camden I, 15 (GG).
- M. obscurellus* Dietz. Brooklyn, N. Y., and sure to occur in New Jersey.
- M. humulis* Gyll. Salt meadows III (Bf); Ocean Co. V (Sm); Brigantine IX (Hn).

The "porcellus" Say. of last edition is an error.

PISSODES Germ.

- P. strobi* Peck. The "white pine weevil"; throughout the State, more or less common, sometimes injurious to pine and spruce. No practical remedy is known except to cut out and destroy infested shoots as soon as noticed.

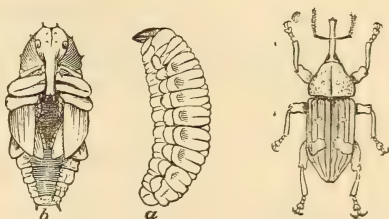


Fig. 159.—White pine weevil, *Pissodes strobi*: a, larva; b, pupa: enlarged.

PACHYLOBIUS Lec.

- P. picivorus* Germ. Woodbury V, Avalon VIII, Atlantic City VI (Brn); Lahaway X (Sm); Brigantine IX (Hn); Brown's Mills VI, 23 (Dke); g. d. in South Jersey (W, Li); on pine, not rare.

• HYLOBIUS Germ.

- H. pales* Hbst. Throughout the State IV, V; breeds under pine bark.
- H. confusus* Kirby. Newark, on blackberry blossoms VI (Bf).

EUDOCIMUS Sch.

- E. mannerheimi* Boh. Snake Hill (Dietz); Hoboken, once abundant (Ch); Hackensack Meadows (Bt); Sea Isle V, 24 (Brn); Anglesea (W); one example only in each of the last two records.

LIXUS Fab.

- L. marginatus* Say. (*sylvius* Boh.) Ft. Lee (div); Arlington meadows III (Bf).

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- L. terminalis** Lec. Throughout the State V-VII; not rare.
- L. concavus** Say. Throughout the State V-VIII, breeds in stalks of dock, rhubarb, sunflower, thistle, etc. The "rectus" of last edition belongs here.
- L. julichi** Casey. Newark Dist., Arlington IV-V (div).
- L. musculus** Say. Throughout the State IV, V; not common.

DORYTOMUS Steph.

- D. mucidus** Say. New Jersey (Jül).
- D. laticollis** Lec. Guttenberg, on poplar (Jül).
- D. brevicollis** Lec. Hudson Co. (Ll); Orange Mts. V, 30 (W); on pussy willows (Bf).

ERYCUS Tourn.

- E. puncticollis** Lec. Hopatcong (Pm); Hudson Co. (div); Snake Hill III, IV (Sf); Newark, salt meadows, early in spring (Bf).

PACHYPHANES Dietz.

- P. amoenus** Say. Hopatcong (Pm); Newark Dist. VII, VIII (Bf); Anglesea (W); on ragweed (Hn).

DESMORIS Lec.

- D. constrictus** Say. East Jersey (Dietz); Anglesea (Bf).
- D. flavicans** Lec. Clementon VIII, 6 (W).

SMICRONYX Sch.

- S. sculpticollis** Casey. Clementon VIII, 9, Sea Isle VI, 11 (Brn).
- S. nebulosus** Dietz. New Jersey (Dietz).
- S. corniculatus** Fab. Chester VII, 4, Hemlock Falls, Newark V, 30 (Bf); Ocean Co. (Lg).
- S. tychoides** Lec. Orange Mts. VI, 10, Irvington (Bf).
- S. griseus** Lec. Ft. Lee on ragweed (Bt); Hudson Co. (Ll); Snake Hill, Orange Mts., Newark (Bf); Spring Lake VIII (Ch).
- S. squamulatus** Lec. Woodbury VII, Atco VIII (Brn); Anglesea VI (div).

PHYLLOTROX Sch.

- P. ferrugineus** Lec. Highlands VI (Ch); Anglesea VII (Sz).

BRACHYBAMUS Germ.

- B. electus** Germ. Hopatcong (Pm); salt meadows V, 17 (Bf); Clementon VIII, 6 (Brn).

ONYCHYLIS Lec.

- O. nigrirostris** Boh. Hopatcong (Pm); Newark on "Sagittaria" V, 30 (Bf); Camden XII, 12 (GG).

ENDALUS Lap.

- E. limatulus** Gyll. Hoboken, salt meadow (Jül); Newark, Snake Hill V, Irvington, sweeping on fern (Bf); Cape May IX, 21 (Dke).
E. ovalis Lec. Salt meadow, under stones, Irvington, on fern V (Bf).

TANYSPHYRUS Sch.

- T. lemnae** Fab. Hudson Co. V, salt meadows (div); Orange VI (Ch); Newark meadows V, 30 (Bf); adhering to boards in water (W).

ANCHODEMUS Lec.

- A. angustus** Lec. Hoboken salt meadows (Jül); Camden and Gloucester marshes along Delaware VI (W); breeds in "Sagittaria."

LISSORHOPTRUS Lec.

- L. apiculatus** Gyll. Jamesburg IV, 18 (Sm); Camden, Gloucester Co., in swamps (W); g. d. (Li).
L. simplex Say. Hudson Co. (Li); Hoboken salt meadows (Jül); Irvington (Bf); breeds in roots of wild rice (Riley).

BAGOUS Germ.

- B. obliquus** Lec. Hudson Co. (Li); Arlington III, 17 (Bf); New Jersey (Jül).
B. americanus Lec. Collingswood VII 27 (GG); Beesley's Pt. VI, 30 (W).
B. magister Lec. Ft. Lee, lily pond (Sf); Hudson Co. (Li); Newark (Bf); Sea Isle VI, Anglesea V, Cape May VI (Brn).
B. cavifrons Lec. Irvington VII, 12 (Bf).

OTIDOCEPHALUS Chevr.

- O. myrmex** Hbst. Hudson Co. (Li); New Jersey (Jül); g. d. (div); the species are inquilineous in Cynipid galls.
O. scrobicollis Boh. Hopatcong (Pm); Orange Mts. (Bf); Hudson Co. (Li); Cape May Court House V, 26, and g. d. (W).

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- O. chevrolatii* Horn. Hopatcong (Pm); Hudson Co. (div); Jamesburg VII (Lv); Cape May C. H. and g. d. V (W); on elm and hickory.
O. lævicollis Horn. Hudson Co. (div); Orange Mts. (Bf); bred from Cynipid galls in oak (Riley).

MAGDALIS Germ.

- M. perforata* Horn. Ft. Lee (Sf); Lakehurst VII (Bf); g. d. (W); on pine.
M. lecontei Horn. Lakehurst VII, 4 (Bf); New Jersey (div).
M. barbata Hbst. Caldwell (Cr); Newark (Bf); Malaga V, 17 (W); Berlin VI, Sea Isle V, Anglesea VI (Brn); sometimes destructive on young hickory.
M. olyra Hbst. Hudson Co. (Ll); Orange Mts. (Bf); Atlantic City, Anglesea (Sm); g. d. (W); breeds under bark of hickory (Ch).
M. inconspicua Horn. Hopatcong (Pm); Caldwell, rare (Bf).
M. pandura Say. Newark Dist. (Bf); Westville (Li); shore counties (W).
M. armicollis Say. Newark Dist. (Bf); New Brunswick VII (Sm); Atlantic City (Castle); g. d. (div); breeds in elm.

TACHYPTERUS Dietz.

- T. quadrigibbus* Say. Throughout the State on fruit trees; larva feeds around the core of apple and pear, but is rarely injurious.

ANTHONOMUS Germ.

- A. scutellaris* Lec. New Jersey, without definite locality.
A. hamiltoni Dietz. Hemlock Falls (Bf); Gloucester V, DaCosta VIII (W); Atco VIII, Iona VI, Sea Isle VIII (Brn); Buena Vista (Li).
A. pusillus Lec. Hopatcong (Pm); Hemlock Falls (Bf); Buena Vista (Li); Atco, Clementon V, 30 (W).
A. profundus Lec. Newark VI, 9, on huckleberry blossoms (Bf); Westville, Buena Vista (Li); Lucaston IV, Newtonville VI (Brn); lives in buds of "Crataegus" (Sz).
A. sycophanta Walsh. Newark Dist. (Bf); Clementon V, 10 (Brn); South Jersey (W); breeds in galls made by a saw-fly on willow.
A. suturalis Lec. Orange Mts. (Bf); Anglesea VII and g. d. (W); said to feed on cranberry and plum in the larval stage.
A. flavicornis Boh. DaCosta, Anglesea VII, 11 (W).
A. morulus Lec. Anglesea VII, 11 (W).
A. corvulus Lec. Hemlock Falls, Orange Mts. (Bf); Cape May C. H., Anglesea V, 26 (W).

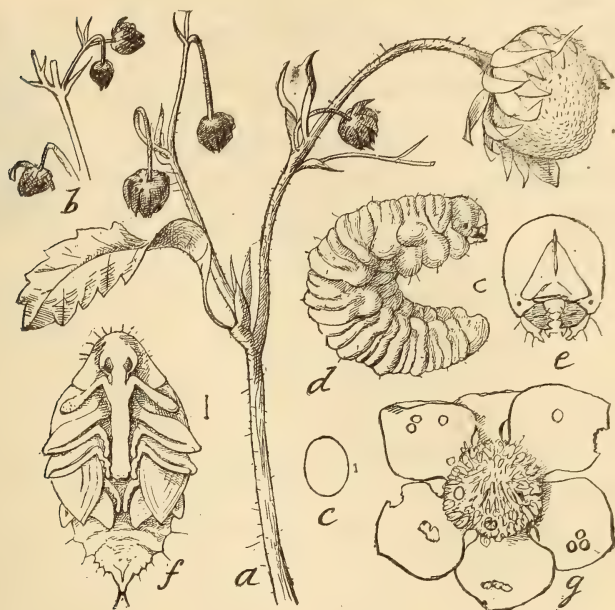


Fig. 160.—Strawberry weevil and its work: *a*, shoot of strawberry plant bearing punctured buds; *b*, enlarged eggs at *c*; at *d*, larva; *e*, its head, much enlarged; *f*, pupa, enlarged; *g*, open strawberry flower showing work of beetles.

- A. signatus** Say. Throughout the State; much more common in the southern counties. This is the strawberry weevil which always does some and occasionally serious injury in Atlantic, Cumberland, Burlington, Ocean and Cape May Counties. It feeds also on black, dew and raspberry and occasionally on other plants. The remedial measures are cultural in most part.
- A. musculus** Say. Throughout the State, not rare VII, on huckleberry.
- A. nigrinus** Boh. Staten Island (Lg); DaCosta VII, 16 (Brn); New Jersey, on horse nettle, "*Solanum virginianensis*" (W).
- A. scutellatus** Gyll. Hopatcong (Pm); Caldwell III, 15 (Bf); Orange Mts. (GG); Newark Dist. (div); DaCosta (Li); Anglesea (W).
- A. juniperinus** Sanb. Anglesea (Li); Bayside IX, 22, on juniper (W), feeding in a fungus growth.
- A. rufipes** Lec. Buena Vista (Li).
- A. disjunctus** Lec. Gloucester Co. (W); DaCosta VII, 16 (Brn); Atlantic City (Castle); Bamber IX, 1 (Dke); Chews Landing IX, 6 (W).

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A. latiusculus Dietz. 5-mile beach, on holly, IV (div).

A. robustulus Lec. Hopatcong (Pm); Jamesburg VII, 4-15 (div).

A. unguaris Lec. New Jersey (Jül); in "Cassia marylandica."

A. nubilus Lec. Orange Mts. (Bf); Anglesea (W); New Jersey (Li).

A. elongatus Lec. Snake Hill V, VI (div); Arlington V, VI (Sf); Newark (div); Anglesea (W).

The *A. "helvolus," "nebulosus"* and "*elegans*" of last edition are errors of determination.



Fig. 161. — Strawberry weevil, *Anthonomus signatus*; enlarged.

ANTHONOMOPSIS Dietz.

A. mixtus Lec. Generally distributed, rare (W).

PSEUDANTHONOMUS Dietz.

P. cratægi Walsh. Westville VII, 20, Anglesea V, 30 (W).

P. incipiens Dietz. Passaic, Staten Island (Bf).

P. longulus Dietz. Jamesburg VII, 4 (Bf).

NEOMASTIX Dietz.

N. solidaginis Dietz. Atco, Clementon (W); Buena Vista (Li); on deflorescent heads of "*Solidago*" species (Dietz).

NANOPS Dietz.

N. schwarzi Dietz. Buena Vista (Li); South Jersey (W).

ELLESCHUS Steph.

E. scanicus Payk. Plainfield, rare (Bf).

E. bipunctatus Linn. New Jersey (Jül); a circumpolar species.

E. ephippiatus Say. Bloomfield, Newark (Bf); Westville, common (W); Lahaway V, 28, on cranberry bogs (Sm); occurs also on willow.

ORCHESTES III.

O. ephippiatus Say. Bloomfield (Bf); Westville (W), on "*Salix fragilis*" (Bt); all the species are leaf miners on willow.

O. salicis Linn. Newark (Bf); a circumpolar species.

O. niger Horn. Newark Dist. (Bf); New Jersey (Jül), on low willows VII (Ch).

O. pallicornis Say. Newark Dist. (Bf); Laurel Springs V, 23 (Dke); So. Jersey (W); on low willows VII (Ch).

The record of "*O. canus*" Horn, was an error.

XANTHUS Dietz.

X. pygmæus Dietz. Anglesea V, 28 (div); on juniper (U).

ACALYPTUS Sch.

A. carpini Hbst. Hopatcong (Pm), Chester VII, 4, Orange Mts. V (Bf).

PRIONOMERUS Sch.

P. calceatus Say. Throughout the State V-VII, locally not rare; the larva mines in leaves of sassafras.

PIAZORHINUS Sch.

P. scutellaris Say. Hudson Co. (div); Anglesea V (div); g. d. (Li).

P. pictus Lec. Hopatcong (Pm); Orange Mts. (Bf); Shrewsbury (Jül); DaCosta, Anglesea (W); always rare.

THYSANOCNEMIS Lec.

T. fraxini Lec. Throughout the State VI, VII, on ash, in the seeds of which it breeds.

T. helvolus Lec. Bloomsbury IX, 3 (Bf); South Jersey (W); rare.

PLOCETES Lec.

P. ulmi Lec. Throughout the State VI, VII; nowhere common.

TYCHIUS Sch.

T. sordidus Lec. Anglesea, one specimen (W).

GYMNETRON Sch.

G. teter Fab. Common throughout the State V, VI, on mullein.

MIARUS Steph.

M. hispidulus Lec. Hopatcong (Pm); Orange Mts. (Bf); Newark (Soc); Plainfield (Sf); in seed capsules of "Lobelia" sp.

LÆMOSACCUS Sch.

L. plagiatus Fab. Throughout the State V-VIII, locally common, usually on oak; sometimes on hickory.

CONOTRACHELUS Sch.

C. juglandis Lec. Throughout the State V-VII; breeds in green fruit of walnut and butternut; not rare.

C. nenuphar Hbst. The Plum curculio; throughout the State, common V-VII and again VIII. Breeds in plum, peach, cherry and apple, often in destructive numbers, and is one of the most serious enemies to fruit growing in New Jersey. May be controlled by persistent spraying with arsenate of lead, 1 pound in 20 gallons of water.

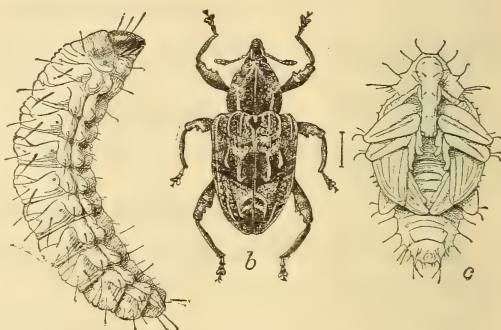


Fig. 162.—The plum curculio, *Conotrachelus nenuphar*: a, larva; b, adult; c, pupa: enlarged.

- C. seniculus** Lec. Woodbury VII, VIII (div); Westville VII, Merchantville X, Sea Isle VI, Peermont VI, Anglesea V, 31 (Brn).
- C. elegans** Say. Throughout the State V, VI and again VIII, IX; larvæ feeding on underground stems of "*Amaranthus retroflexus*" (Ch).
- C. aratus** Germ. Atlantic Co., rare (W).
- C. cratægi** Walsh. Throughout the State on quince, and sometimes locally injurious; VI-VIII.
- C. naso** Lec. Atlantic Co. (W); Anglesea V, VIII (Brn); on "*Cratægus*," rare.
- C. posticatus** Boh. Throughout the State V-IX; not rare.
- C. geminatus** Lec. Throughout the State VIII until next VII; locally common.
- C. cribricollis** Say. Westville I, 28, sifting (W).
- C. anaglypticus** Say. Throughout the State VI.
- C. leucophæatus** Fab. New Jersey IX, 23 (Bland).
- C. fissunguis** Lec. Along the river front near Camden, and everywhere along shore in Mallow swamps; breeds in seed pods of "*Hibiscus*" sp.

RHYSSSEMATUS Chev.

- R. palmacollis** Say. Hemlock Falls VII (Bf).
- R. lineaticollis** Say. Boonton VI, VII (GG); Caldwell (Cr); Ft. Lee, in seed pods of milkweed (Bt); Snake Hill (Sf); Madison VII (Pr); Newark Dist. (div); Anglesea VI (Brn).

CHALCODERMUS Sch.

- C. collaris** Horn. Iona VI, 8 (Dke); Atlantic City (Castle); Sea Isle VI, Cape May VI (Brn); Anglesea V, 31, VI, 28 (W).
- C. spinifer** Boh. Newark, one specimen on cherry blossoms (Bf).

ZAGLYPTUS Lec.

- Z. sulcatus** Lec. Ft. Lee (Sf); Staten Island (Lg).
Z. striatus Lec. Anglesea (W).

ACALLES Sch.

- A. carinatus** Lec. Berkeley Hts. VII, 6 (Bf).

TYLODERMA Say.

- T. foveolatum** Say. Throughout the State V, VI; breeds in stems of "Enothera biennis" (Ch), and in "Epilobium."
T. fragariæ Riley. Arlington, Maplewood, under stones (Jül); breeds in strawberry.
T. æreum Say. Throughout the State VI, VII, not rare.
T. nigra Casey. Irvington VI, 30, Arlington I-III (Bf).
T. punctulata Casey. Irvington VI, 21 (Bf).
 The record of "T. baridium" Lec. is an error of locality.

PHYRDENUS Lec.

- P. undatus** Lec. New Jersey, in swamps (Jül); lives on "Solanum" (Sz).

CRYPTORHYNCHUS Ill.

- C. parochus** Hbst. Chester (Dn); Ft. Lee (Sf); Newark Dist. (Bf), in butternut (Jül).
C. bisignatus Say. Throughout the State V-VII, on chestnut, beech and birch, probably lives under the bark.
C. pumilus Boh. Hopatcong (Pm); Jamesburg VII, 4 (Bf); New Jersey (Jül); may be a color variety of the preceding.
C. fuscatus Lec. Hopatcong (Pm); Orange Mts., Newark, rare (Bf); Merchantville VI, 28 (Dke); Clementon XII, sifting old leaves in a swamp (W).
C. obliquus Say. Hudson Co. (Ll); Lakehurst V, 30 (Sf); g. d. rare (W).
C. obtentus Hbst. Hopatcong (Pm); Ft. Lee (Sf); Orange Mts. VI (div).
C. fallax Lec. Throughout the State VI, VII; not rare.
C. minutissimus Lec. Hudson Co. (Ll); Atco, Anglesea V, 30, on dead oak twigs (W).
C. tristis Lec. Hopatcong (Pm); Snake Hill, Arlington (Sf); Newark, Orange Mts. VI, 7, rare (Bf).
C. ferratus Say. Throughout the State V-VII; not common.
C. oblongus Lec. Dunellen, 1 specimen (Coll. Dietz).
C. lapathi Linn. Throughout northern New Jersey, on willow; an introduced species not yet found south of the Piedmont Plain, but recently taken near Philadelphia, in Pennsylvania.

BAROPSIS Lec.

- B. cribratus** Lec. New Jersey (Coll. Horn). The locality label is open to question, and the source of the specimen is unknown.

LECHRIOPS Sch. (PIAZURUS Sch.)

- P. oculatus** Say. Ft. Lee (Sf); Newark Dist. V (Bf); Jamesburg V, 10 (Sm); Westville (Li).

CYLINDROCOPTURUS Heller.

- C. binotatus** Lec. (*Copturodes*) Hopatcong (Pm); Hudson Co. (Li); Snake Hill, Ft. Lee (Jul); Orange Mts. (Bf); on dry sumac and locust.
- C. quercus** Say. Hudson Co. (Li); Newark Dist. (Bf); g. d. (W); Woodbury VI, 17 (Dke); common on oak.
- C. longulus** Lec. Atco, Egg Harbor, on oak (W); in galls of "Podapion" (U).

EULECHRIOPS Faust.

- E. minutus** Lec. (*Zygomicros*) Orange Mts., Jamesburg VII (Bf); Highlands VII (Sf); Anglesea on oak VII (div).

ACOPTUS Lec.

- A. suturalis** Lec. Hopatcong (Pm); Ft. Lee (Sf); Palisades III (Lv); Hudson Co. (Li); Orange (Jül); Newark Dist. (Bf); Highlands VII, in dead beech (Ch).

PSOMUS Casey.

- P. politus** Casey. Hemlock Falls, Jamesburg VII (Bf).

TACHYGONUS Sch.

- T. lecontei** Gyll. Caldwell (Cr); Lakehurst VII, IX (div); Gloucester, Atco, on oak, rare (W).
- T. spinipes** Casey. English Creek (Bland); Iona VI (div); Landisville (Li); DaCosta VI (Dke); Seaville VI (Brn).

MONONYCHUS Germ.

- M. vulpeculus** Fab. Throughout the State V, VI, IX on blue flag and other flowers; breeds in the seed pods of "Iris versicolor."

CRAPONIUS Lec.

- C. inæqualis** Say. Hoboken (Jül); Orange Mts. (Bf); Laurel Springs V, 23 (Dke); Anglesea V, 30 (W); feeds on grape; but not injurious with us.

ACANTHOSCELIS Dietz.

- A. curtus** Gyll. Orange Mts., in swamps (Bf); Anglesea (Li).
- A. acephalus** Say. Common all along shore V-VII, on evening primrose.

AULEUTES Dietz.

- A. tenuipes** Lec. Orange Mts. (W).
A. epilobii Payk. Hudson Co. (Ll); Orange Mts. in swamps (Bf).
A. nebulosus Lec. Throughout the State IX-III, VII, VIII; not common.

ACALLODES Lec.

- A. ventricosus** Lec. Ft. Lee (Sf); Orange Mts., Newark (Bf); Westville I, sifting (W); Lahaway V, 28 (Sm).

CÆLIODES Sch.

- C. flavicaudis** Boh. (*apicalis* Dietz.) Shrewsbury on nettle (Jül).

CEUTORHYNCHUS Germ.

- C. rapæ** Gyll. Throughout the State V-VII; feeds on cabbage, rape and allied plants, often abundantly, and is known as the "cabbage curculio."
C. bolteri Dietz. Millburn V, 30, Irvington, rare (Bf).
C. sulcipennis Lec. Throughout the State V-VII.
C. decipiens Lec. Orange Mts. (Bf).
C. pusio Mann. Chester, Hemlock Falls (Bf).
C. semirufus Lec. New Jersey (Jül).
C. septentrionis Gyll. Throughout the State, fall to spring on wild mustard; often common.
C. puberulus Lec. With the preceding and probably confused with it.
C. zimmermanni Gyll. New Jersey (Ll).

CÆLOGASTER Sch.

- C. zimmermanni** Gyll. So. Orange on beggar nits (Jül); Newark (Soc).

PERIGASTER Dietz.

- P. cretura** Hbst. Caldwell (Cr); New Jersey (Jül).

PELENOMUS Thom.

- P. sulcicollis** Fab. Throughout the State, not rare on "Polygonum."
P. squamosus Lec. Irvington (Bf).

MECOPELTUS Dietz.

- M. fuliginosus** Dietz. Newark (Dietz); occurs with and is often confounded with "*P. sulcicollis*."
M. scandens Dietz. Anglesea VII, 12 (W).

RHINONCUS Sch.

- R. occidentalis** Dietz. Staten Island (Lg); Jamesburg VII, 11 (Sm).
R. pyrrhopus Boh. Throughout the State V-VII feeding on "Rumex."
R. longulus Lec. Orange Mts., rare (Bf); South Jersey.

BARIS Germ.

- B. umbilicata* Lec. Hopatcong (Pm); Hudson Co. (Ll); Orange Mts. (Bf); Newark VI, 12, Lahaway V, 28 (Sm); Sea Isle VI, 11 (Brn).
B. callida Casey. Orange Mts., Newark Dist. (Bf); Laurel Springs V, 23 (Dke); Anglesea VII (div).
B. subænea Lec. Throughout the State V-VII; not rare.
B. transversa Say. Anglesea V, 30 (W), on yarrow (Jül).
B. confinis Lec. Ocean Co. V, 28 (Sm).
B. aerea Boh. Cramer Hill V, VI (GG); Manumuskin IV, 23 (Dke); Atlantic City (Castle).
B. scolopacea Germ. Throughout the State V-VII, locally common on ragweed.

PLESIOBARIS Casey.

- P. t-signum* Boh. New Jersey (W).
P. albilatus Lec. Buena Vista, on yellow daisies.

GLYPTOBARIS³ Casey.

- G. rugicollis* Lec. Dunellen VI (Dietz Coll); Atco, rare (W); on milkweed.

The "*Onychobaris pectorosa*" of last edition was an error.

MADARELLUS Casey.

- M. undulatus* Say. Throughout the State, not rare; occurs on grape and Virginia creeper (Ch).

AULOBARIS Lec.

- A. ibis* Lec. Orange Mts. (Bf).

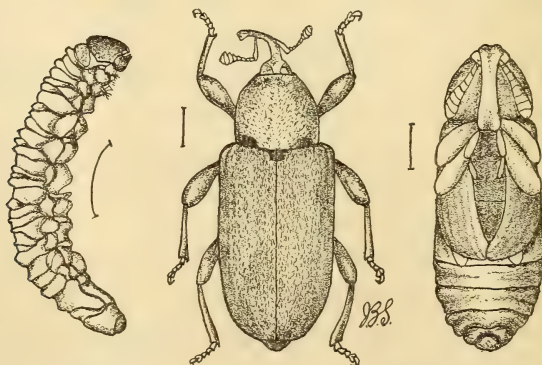
TRICHOBARIS Lec.

Fig. 163.—Potato stalk borer, *Trichobaris trinotata* larva, pupa and adult, enlarged.

- T. trinotata** Say. Throughout the State, locally common and sometimes injurious. The larva is the "potato stalk borer," which eats out the stalk of the plant and prevents the crop from maturing. The beetles remain in the stalks all winter, and if these stalks are raked up and burned when the crop is harvested the entire brood will be destroyed. The native food is nettle.

AMPELOGLYPTER Lec.

- A. ater** Lec. Cape May Court House V, 26 (W).

PSEUDOBARIS Lec.

- P. augusta** Lec. Hopatcong (Pm); Snake Hill (Bf).
P. nigrina Say. Throughout the State V, VI; not common.

CENTRINUS Sch.

- C. calvus** Lec. DaCosta VI, 3 (Brn).
C. picumnus Hbst. Common throughout the State on flowers VI-VIII.
C. albotectus Casey. Anglesea VII (Bf).
C. perscitus Hbst. New Jersey (Casey).
C. penicellus Hbst. Riverton IX, Woodbury VI, 7, Glassboro VII, 27, IX (GG); Atco VII, Anglesea VII (W).
C. scutellum-album Say. Common throughout the State VII.

NICENTRUS Casey.

- N. lineicollis** Boh. Throughout the State locally and seasonally common.

LIMNOBARIS Bedel.

- L. confusa** Boh. Hopatcong (Pm); Orange Mts., rare (Bf).
L. confinis Lec. Montclair (U S Ag); New Jersey (Jül).
L. concinnus Lec. So. Jersey (W).
L. rectirostris Lec. Hopatcong (Pm); So. Orange (Jül); Newark VII (Bf).

OLIGOLOCHUS Casey.

- O. robustus** Casey. "New Jersey"; type locality (Li).

IDIOSTETHUS Casey.

- I. tubulatus** Say. Hopatcong (Pm); Ft. Lee (Sf); Orange Mts. (Bf).

BARILEPTON Lec.

- B. filiforme** Lec. Salt meadows V (Bf); Masonville VI, 16 (W).
B. albescens Lec. Westville VII, 2, one example (Brn).
B. quadricolle Lec. West Hoboken, one specimen (Jül).

PLOCAMUS Lec.

- P. hispidulus** Lec. New Brunswick (Sm); Lakehurst VII, 4 (Bf); Atco VIII, 21 (W); breeds in dead twigs of locust (W).

BALANINUS Germ.

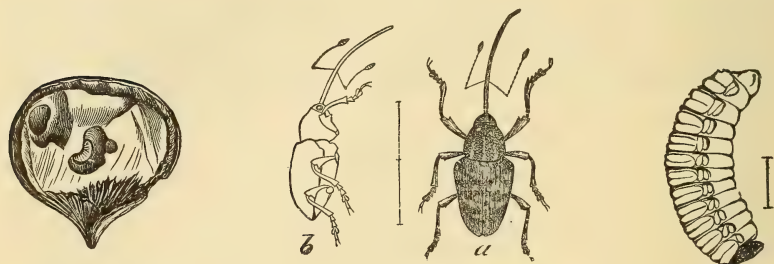


Fig. 164.—Chestnut weevil and its work; *a*, beetle from above; *b*, same in outline from side; larva: all enlarged.

- B. obtusus** Blanch. Hopatcong (Pm); Newark Dist. (Bf); New Brunswick.
- B. baculi** Chitt. (*uniformis* Lec.) Throughout the State; larva in acorns.
- B. nasicus** Say. Throughout the State; larva in acorns.
- B. pardalis** Chitt. Sandy Hook; larva breeds in acorns (Coll).
- B. caryæ** Horn. Throughout the State VI–VIII, the larva in hickory.
- B. rectus** Say. Common everywhere; the larva in chestnut.
- B. quercus** Horn. Brigantine IX (Hn); New Jersey (Jül); larva in acorns.
- B. proboscoideus** Fab. Woodside, Orange Mts. (Bf); Newark, Lahaway IX (Sm); Moorestown (U S Ag); larva in chestnuts and chinquapins. Is the same as the “caryatrypes” of the last edition.
- B. confusus** Hamilton. Hopatcong (Pm); Anglesea (Sm); larvæ on acorns.

The species of this genus are all nut-weevils, and those that feed in hickory and chestnut are often seriously injurious. The chestnut weevils in New Jersey are especially troublesome where the European and Japanese varieties are grown. There is no insecticide that is available to reach the insect in any stage, and the only methods of control are to collect the nuts as soon as they fall and market them, or to store them in tight barrels, from which the larvæ cannot escape when they emerge from the nuts.

Family BRENTHIDÆ.

Contains only a single very curious species, in which the males have prominent mandibles at the ends of the short robust snout, and the females have long, cylindrical beaks, by means of which they bore into the wood to lay their eggs. When these beaks become wedged, as they sometimes do, the males use their forceps-like jaws to pull them out.

EUPSALIS Lec.

- E. minuta** Dru. Throughout the State on chestnut, oak and maple; hardly common anywhere.

Family CALANDRIDÆ.

Stoutly built, very rigid weevils, with deeply striate wing-covers and characteristically marked thoracic sculpture. The beak is usually moderate in length and stout. The family contains the "corn bill-bugs," the "grain weevils" and "rice weevil," and a considerable proportion is therefore of economic importance. In the principal genus "Sphenophorus," Mr. F. H. Chittenden has been good enough to assist in the arrangement of species. All the members of that genus breed in reeds and grasses, and preferably such as have large or bulbous roots.

RHODOBÆNUS Lec.

- R. tredecimpunctatus* Ill. Throughout the State VII, not really common; breeds in the stems of a variety of weeds—"Ambrosia," "Helianthus," "Cenothera," "Xanthium," etc.

SPHENOPHORUS Sch.

- S. inæqualis* Say. Gloucester IV, 24, on sandy fields in wagon ruts (W); Woodbury VI, Brigantine VII, Atlantic City VI, Sea Isle VI (Brn); Anglesea V, VI (div).
- S. æqualis* Gyll. (*ochreus* Lec.) Orange Mts. (Hess); Arlington meadows (Bf); Snake Hill (Jl); Atlantic City VII, 25, Sea Isle VI, Anglesea VI (div); breeds in roots of "Scirpus" sp.
- S. pertinax* Oliv. Throughout the State V, VI, in swampy meadows and marshes along shore; breeds in roots of "Calamus."
- S. setiger* Chittn. Highland, a type locality (Ch); Lahaway VI, 22, Anglesea V (div).
- S. villosiventris* Chittn. New Brunswick (Coll); Woodbury, Westville, Gloucester IV, V, Anglesea V (div).
- S. costipennis* Horn. Caldwell (Cr); Snake Hill IV, 26 (Lv); Brigantine Beach IX (Hn); seashore (W).
- S. cariosus* Oliv. Newark Dist. (Bf); Lucaston IX, 24 (Dke); Lahaway VI, 22 (Sm); Brigantine Beach IX (Hn); Anglesea V, 30, VII, 12 (div).
- S. callosus* Oliv. Jamesburg VII, 11 (Coll).
- S. zææ* Walsh. (*sculptilis* Uhl). Throughout the State, common in the southern counties, where it is the "corn bill-bug." The larvæ live in timothy roots, and where corn follows this sod it is apt to be badly eaten by the adults when they mature in late June or early July. Remedy, fall-plow old sod land intended for corn.



Fig. 165.—Bill-bug, *Sphenophorus* sp., from side.

- S. destructor* Chtttn. Anglesea VI, VII (div); the type locality.
- S. melanocephalus* Fab. Hudson Co. (Ll); Newark Dist. (Bf); Lahaway (Sm); Westville V (div); Anglesea V (div).
- S. pontederiæ*. Chtttn. Gloucester V, 27 (Brn); breeds in roots of pickerel weed (Ch).
- S. sayi* Gyll. Anglesea VII (Sz).
- S. venatus* Say. (*placidus* Say.) Throughout the State, common, V-VII, most abundant along the seashore.
- S. apicalis* Lec. Gloucester IV, 24 (W); Avalon VI, 23 (Brn).
- S. parvulus* Gyll. Throughout the State, locally not rare V-VII; breeds in roots of blue grass (Ch).
- S. minimus* Chtttn. Atlantic City, Anglesea, in wash-up (W).
- S. marinus* Chtttn. Ocean Co., on cranberry bogs (Sm); Westfield VI, Sea Isle VI, 10 (Brn), type locality; Atlantic City (W); Mr. Chittenden notes "evidently maritime and probably local."
- S. retusus* Gyll. Throughout the State; not common IV and IX.
- S. gagatinus* Gyll. "New Jersey" (Coll); probably Newark Dist. "Simplex," Mr. Chittenden says, is a strictly Pacific Coast form.

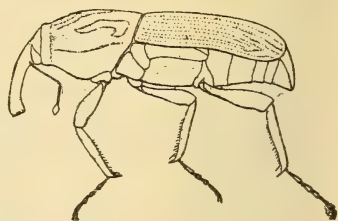
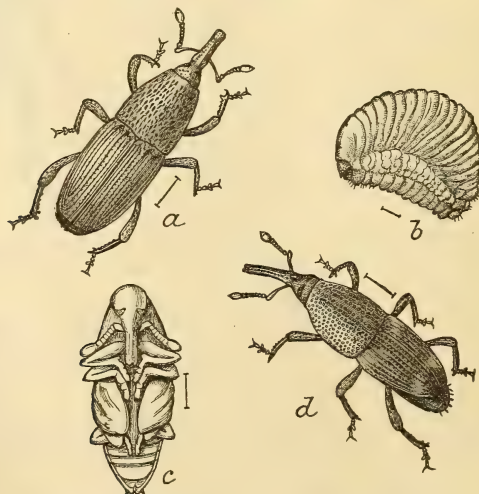


Fig. 166.—Bill-bug, *Sphenophorus* sp., from side.

CALANDRA Clairv.

- C. oryzae* Linn. The "rice-weevil"; infests stored grain and is g. d.
- C. granaria* Linn. The "grain" or "granary weevil," often injurious in



Calandra granaria.—a, adult; b, larva; c, pupa; d, *C. oryzae*, adult.

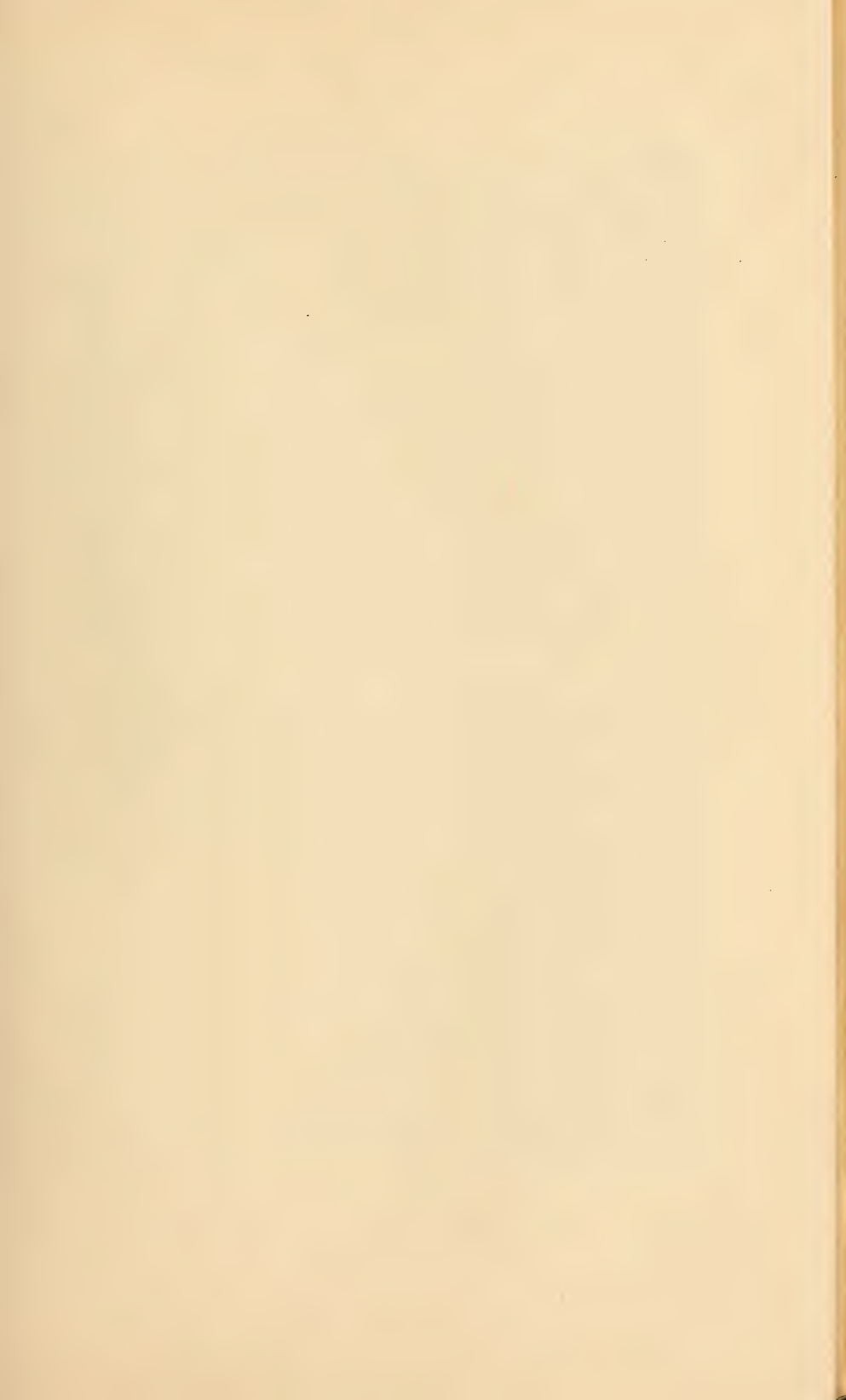




Fig. 168.—Work of hickory bark-beetle, *Scolytus 4-spinosus*.

stored grain. Closed bins to keep out the insects and bisulphide of carbon to destroy them are the usual measures.

DRYOPHTHORUS Sch.

- D. americanus** Bedel. (*corticalis* Say.) Throughout the State, winter and early spring, in very old logs, under bark of pine and in sifting.

HIMATIUM Woll.

- H. errans** Lec. Newark district, Berkeley Hts. VII, 6 (Bf).

COSSONUS Clairv.

- C. platalea** Say. Palisades V (Lv); Ft. Lee (Sf); Newark Dist (Bf); g. d. (W); under bark of trees.
C. concinnus Boh. Chester (Dn); Brown's Mills V, 12, VII, 1 (Dke).
C. corticola Say. Newark Dist. (Bf); Staten Island IV, 23 (Lg); Spring Lake (Ch); Lakehurst VII, 7 (Bf); Anglesea (W); under pine bark.
C. impressifrons Boh. Brigantine, beach and mainland IX (Hn).

MESITES Sch.

- M. subcylindricus** Horn. Hopatcong (Pm); Orange Mts. (Bf); Cape May VII (Sz); under bark of washed-up pine logs, Anglesea (W).

PHLÆOPHAGUS Sch.

- P. minor** Horn. New Jersey (Jl); Ft. Lee (Sf); Newark (Bf); Anglesea VII (Sz); breeds in dead birch, elm, ash, willow, etc.
P. spadix Hbst. West Bergen, rare (Bf); Brigantine Beach VI, 23 (Brn); an imported species not yet commonly found.

AMAUORRHINUS Fairm.

- A. parvicollis** Casey. New Jersey, in dead wood of various trees (Ch).

WOLLASTONIELLA Ckll.

- W. quercicola** Boh. Landisville (Li); Anglesea VII, 14 (W); breeds in dead wood of various trees.

HEXARTHURUM Woll.

- H. ulkei** Horn. Newark (Bf).

RHYNCHOLUS Germ.

- R. brunneus** Mann. New Jersey (Jl); under bark of wild cherry (Ch).
R. oregonensis Horn. Anglesea (W).

STENOSCELIS Woll.

- S. brevis** Boh. Hudson Co. (Ll); Ft. Lee (Sf); Newark Dist. (Bf); Ocean Co. V (Sm); breeds in dead wood of most deciduous forest trees.

Family SCOLYTIDÆ.

Commonly known as "bark beetles." They are usually cylindrical, or nearly so, often with the end of the elytra truncate or armed with teeth in the male; the head bent down, often retracted and overshadowed by the prothorax, which may be roughened or rugose, and the mouth parts forming none or only a very short snout. The legs are generally short, often broad and somewhat flattened, capable of being very closely folded to the body. They are all borers in bark, bast or heart-wood, and almost every species is as well characterized by its work as by its structure. In the common type of which the "fruit bark beetle" is an example, the adult beetle makes a central gallery on each side of which eggs are laid in little recesses. From these eggs hatch grub-like larvæ, which bore between bark and wood, diverging as they increase in size. When these larvæ are full grown they pupate at the end of the boring, and in due time the adult emerges through a little round hole. Species of this type usually attack trees not quite healthy or badly injured, and when once they have secured a footing in an orchard tree it might as well be cut out and burned.

Other species bore into the solid wood, and as readily into healthy as sickly trees. Here the galleries are often blackened and serve for the propagation of "Ambrosia," a peculiar fungus upon which both larvæ and adult beetles feed. Some of these forms are of extreme interest, and their injury is not only direct as affecting the life of the tree, but indirect as affecting the value of the wood for timber.

The classification of the family is in an unsatisfactory condition at present. There are many undescribed species and many that are undetermined in collections. Dr. A. D. Hopkins, of the U. S. Department of Agriculture, has been studying the group for some years, but has not yet published the results of his labors except in "Dendroctonus." The present list, therefore, merely adds a few species, some new localities and a little additional information concerning food habits.

PLATYPUS Hbst.

P. flavicornis Fab. Sea Isle VII, 4 (Brn); Anglesea V, 21 (div).

CORTHYLUS Er.

C. punctatissimus Zimm. Eagle Rock (Bf); Staten Island (Lg); Cape May C. H. X, 22, cut out of roots of huckleberry, readily noted by yellow dust on surface of ground (W); boring in green sassafras (Hpk).

C. columbianus Hopk. 5-mile beach, cut out of toad stomachs VII, 4; bores into healthy oak and other hardwood trees (W).

MONARTHURUM Kirsch.

- M. fasciatum* Say. Throughout the State V-VIII; bores into healthy and sick trees in great variety; deciduous and coniferous.
- M. mali* Fitch. With the preceding, but more rare and with an even larger range of food plants, including apple; Anglesea IV, 23, brood found emerging from oak and other trees (W).

GNATHOTRICHUS Eich.

- G. materarius* Fitch. Grenloch, Iona V, 17, entering dying white pine (W); probably occurs wherever this tree grows in the State.

PITYOPHTHORUS Eich.

- P. bellus* Eich. Iona IV, 30, entering pine (W).
- P. minutissimus* Zimm. Throughout the State in oak twigs, doing little or no damage. Adults may be cut out any time during the winter.
- P. pullus* Zimm. New Jersey (Jül); Atco, rare on pine (W).
- P. fagi* Hopk. New Brunswick, boring in oak twigs (Coll).
- P. sparsus* Lec. Orange Mts., rare (Bf); mines in green bark of injured or dying pine trunks or branches and hastens death (Hpk).
- P. pulicarius* Zimm. Bamber VI, 3 (W); Cape May C. H. VIII on pine (Sz); breeds in pine twigs (Hpk).
- P. puberulus* Lec. New Brunswick (Coll); Bamber VI, 3, Anglesea IV, 27 (W); Cape May C. H. VII (Sz); infests dying terminal twigs of pine.
- P. querciperda* Sch. Hemlock Falls, rare (Bf).
- P. frontalis* Hopk. Eagle Rock, rare (Bf); New Brunswick in oak twigs (Sm).

There are at least four other undetermined and probably new species in collections.

HYPOTHENEMUS Westw.

- H. ruficollis* Hopk. Gloucester V, 13, Grenloch X, 15, Lahaway III, 26, cut out of peach, cherry, etc. (W).
- H. atomus* Hopk. Westville II, 5, cut out of oak bark (W).
- H. eruditus* Westw. Orange Mts. (Bf); New Brunswick (Sm); Anglesea VII (Sz); breeds in pith and wood of dead vines and twigs in great variety.
- H. hispidulus* Lec. New Brunswick from hickory and oak (Sm); cut out of sumac (W).
- H. erectus* Lec. New Brunswick from hickory and oak (Sm).

The species are unsatisfactorily distinguished, and the last three may be partly confused or may represent more distinct forms.

STEPHANODERUS Eich.

- S. dissimilis** Zimm. Orange Mts. V, 19 (Bf); New Brunswick (Sm); Anglesea (W); bred from grape and oak.

There are other unnamed species in collections.

XYLOTERES Er.

- X. politus** Say. (unicolor Eich.) Hopatcong (Pm); Orange Mts., rare (Bf); Lakewood (Ll); enters into green wood of dying beech, pine, etc.
- X. scabricollis** Lec. Jamesburg V, 10 (Sm); Grenloch IV, 8, Iona V, 7, entering dying white pine (W); Brown's Mills V, 21 (Dke).
- X. lineatus** Oliv. On hemlocks VI, 11 on the Pennsylvania side of the Delaware River and sure to occur in North Jersey on the opposite bank (W).

XYLEBORUS Eich.

- X. dispar** Fab. Orange Mts., rare (Bf); Jamesburg V, cut from birch shoots (Sm); Anglesea (W); infests also hemlock, apple, beech, oak.
- X. pyri** Peck. With the preceding and perhaps identical with it.
- X. obesus** Lec. Hopatcong (Pm); Lakewood (Ll); in black oak, beech and hemlock timber, causing large black pinholes (Hpk).
- X. affinis** Eich. Maurer V, 16, in dead chestnut (Gr).
- X. inermis** Eich. Maurer V, 16, in dead chestnut, associated with the preceding (Gr).
- X. celsus** Eich. Orange Mts. VI (div); at light (Ch); DaCosta (W); breeds in hickory.
- X. fuscatus** Eich. Orange Mts. (Bf); Ocean Co. (Sm); Woodbury IV, 5-mile beach IV, 23, in roots and stumps of oak, as a rule in same galleries with "pubescens" (W); breeds also in hickory, chestnut and pine (Hpk).
- X. xylographus** Say. DaCosta, Cape May C. H. V, 26 (W); Anglesea VII (Sz); on apple, ironwood and other deciduous trees.
- X. pubescens** Zimm. Occurs with and has the same habits as "fuscatus"; breeds also on cherry, magnolia, etc. (Hpk).
- X. cælatus** Eich. Camden II, 7 (GG).

Mr. Wenzel has an undescribed species from maple, taken in Gloucester Co., and on 5-mile beach, in winter and early spring.

DRYOCÆTES Eich.

- D. autographus** Ratz. Orange Mts. (Bf); mines under green bark of logs, stumps, etc., of spruce (Hpk).
- D. granicollis** Lec. New Jersey (Jül); habits as above (Hpk), and also found under bark of chestnut, near roots (Ch).

TOMICUS Latr.

- T. calligraphus** Germ. Throughout the State; mines under green bark of dead or dying pines (Hpk).
T. cacographus Lec. With the preceding on pine and spruce.
T. pini Say. Newark (Bf); DaCosta VI, 2, and still in the wood VII, 7 (W); Avalon VIII, 2 (GG); infests pine and spruce (Hpk).

MICRACIS Lec.

- M. asperula** Lec. New Jersey (Jül).
M. opacicollis Lec. Throughout the State, winter and spring, in small oak twigs; common.
M. suturalis Lec. Newark (Bf).

THYSANOES Lec.

- T. quercus** Hopk. Eagle Rock (Bf); infests the bark of dead oak and chestnut twigs (Hp).
T. fimbricornis Lec. Westville VI, 16, Chews Landing VI, 9, on hickory and just leaving the wood (W).

SCOLYTUS Geoff.

- S. quadrispinosus** Say. Throughout the State in July; bores under bark of feeble or dying hickories and often kills shade trees that would otherwise have recovered under stimulating treatment.
S. muticus Say. Newark (GG).
S. rugulosus Ratz. The fruit bark beetle; common throughout the State, often hastening the death of all sorts of fruit trees. A tree once thoroughly infested should be cut down and destroyed; one just attacked may sometimes be saved by stimulating treatment.

CHRAMESUS Lec.

- C. icoriæ** Lec. Throughout the State V & VI, boring under bark of cut or dying hickory branches.

PHLÆOTRIBUS Latr.

- P. liminaris** Harr. Hopatcong (Pm); Orange Mts. V, 19 (Bf); attacks living peach, plum, cherry (Ch), mining under green bark (Hpk).
P. frontalis Oliv. New Jersey (Jül); under green bark of Mulberry (Hpk).



Fig. 169.—Fruit bark-beetle,
Scolytus rugulosus;
 enlarged.

CARPHOBORUS Eich.

- C. bifurcus* Eich. New Jersey (Jül); said to infest pine.
C. bicristatus Chap. Anglesea (W); normally a floridian species.

DENDROCTONUS Er.

- D. terebrans* Oliv. Throughout the State, locally common; mines in green bark and turpentine on pine (Hpk), and enters trees late IV and early V (W).
D. rufipennis Kirby. Riverton IV, 22 (GG); Lakewood (Ll).
D. valens Lec. Occurs with "terebrans," usually in felled trees within two feet from base (W).

HYLESINUS Fab.

- H. aculeatus* Say. Throughout the State; common on cut ash (Bf); enters trees late IV, early V (W); mines under the green bark (Hpk).
H. fasciatus Lec. Clementon V, 20, infests young shoots of healthy white ash (W).
H. opaculus Lec. New Jersey (Jül); 5-mile beach IV, 23 (W), mines under green bark of elm (Hpk).
H. trifolii Müll. The clover-root borer; g. d., but not injurious.

CNESINUS Lec.

- C. strigicollis* Lec. Orange Mts., g. d. (Bf); Westville X, 6, Woodbury VI, 22, Cape May C. H. V, 26, cut out of terminal twigs of oak (W).

PHLÆOSINUS Chap.

- P. dentatus* Say. Throughout the State, on cedar; entering in June.

CRYPTURGUS Er.

- C. pusillus* Gyll. New Jersey (Jül); infests pine and spruce, boring in and under bark.
C. alutaceus Sz. Lahaway III, 26 (W).

HYLASTES Er.

- H. porculus* Er. Newark (Bf); g. d. (W); in bark of pine (Hpk).

HYLURGOPS Lec.

- H. glabratus* Zett. New Jersey (Sm); Da Costa (GG).



Fig. 170. — Clover root-borer, *Hylesinus trifolii*: a, work of the larva in stem and roots of clover plant; natural size; b, larva; c, pupa; d, adult beetle; enlarged.

- H. pinifex** Fitch. New Jersey (Jül); Newark (Soc); attacks pine, mining in the green bark of dying trees. The relation between these two species is not yet settled.

Family ANTHRIBIDÆ.

In these insects the mouth parts are more distinct, the snout broad, obtuse, and the labrum is present. The antennæ are not elbowed, but are sometimes very long, with an obvious cylindrical club at tip. The colors are usually gray or brown, mottled with black, and the insects are rather pretty, resembling closely the surfaces on which they are found.

Little is known of their life history. The beetles are usually found on dead wood or, on tree fungi; but the larva of at least one of our species is believed to be a feeder on scale insects, although most of those known develop in dry rot decay or in fungi.

EURYMYCTER Lec.

- E. fasciatus** Oliv. Orange Mts. (Bf); Orange, Snake Hill (Jl); Penbryn VIII, 2 (Dke); sea coast, always rare (W); Avalon VIII, 2 (GG); Sea Isle VI, 26, Seaville VI, 11, Anglesea V, 31 (Brn); on dead twigs.

TROPIDERES Sch.

- T. bimaculatus** Oliv. Newark (Bf).
T. rectus Lec. Sea coast, rare (W); on dead twigs.

ALLANDRUS Lec.

- A. bifasciatus** Lec. New Jersey, on linden (Jül).

HORMISCUS Waterh.

- H. saltator** Lec. Hopatcong (Pm); Newark (Bf); Gloucester (W); Da-Costa VI, 12, Iona VI, 22, Newtonville VI, 19 (Brn); Anglesea VII (Sz); always rare; breeds in dead wood of deciduous trees (Ch).
H. sp. nov. Schwarz. Anglesea VII (Sz).

TOXOTROPIS Lec.

- T. pusillus** Lec. Anglesea (W).

EUSPHYRUS Lec.

- E. walshii** Lec. Hopatcong (Pm); Orange Mts., Newark Dist. (Bf); Highlands (Ch); Gloucester (W); Westville VII, 2 (GG); Avalon VI, 23 (Brn); breeds in dead wood of deciduous trees (Ch).

PIEZOCORYNUS Sch.

- P. mixtus** Lec. Seashore (W); Avalon VI, VIII (div); Ocean City VII, Sea Isle VI (Brn); Anglesea (Li); on old logs and under bark.
P. moestus Lec. Brigantine Beach IX, rare (Hn).

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ANTHRIBUS Geoff.

- A. cornutus** Say. Jamesburg VII (Bf); DaCosta VI, 3 (Brn); Atco V, 10, Cape May C. H. V, 26 (W).

CRATOPARIS Sch.

- C. lunatus** Fab. Throughout the State, V, VII, VIII, on tree fungus and dead trees; develops in fungus-attacked logs and stumps (Ch).

BRACHYTARSUS Sch.

- B. alternatus** Say. "New Jersey" (Jl); Ft. Lee (Sf); Hudson Co. (Ll).
B. tomentosus Say. Hudson Co. (Ll); common throughout So. Jersey (W).
B. plumbeus Lec. Highlands (Ch).
B. variegatus Say. Salt meadows (Bf); throughout the State south of the Piedmont Plain V-VII; breeds in smut of corn (Ch).

ANTHRIBULUS Lec.

- A. rotundatus** Lec. Ft. Lee (Sf); Newark, Orange Mts. (Bf); Atco V, 21, Newtonville VII, 9 (Brn); DaCosta VIII, 14, Anglesea (W).

ARÆOCERUS Sch.

- A. fasciculatus** DeG. On dried fruits and similar stores (Ch).

CHORAGUS Kirby.

- C. sayi** Lec. Orange Mts., Jamesburg (Bf).
C. zimmermani Lec. Fort Lee (Sf); Hemlock Falls (Bf).

Order LEPIDOPTERA.

This order contains the butterflies and moths or "millers," characterized by the scaly covering or clothing which, except in rare instances, covers

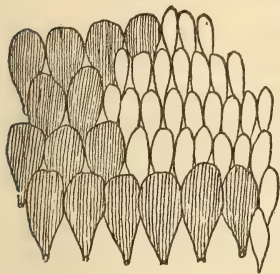


Fig. 171.—Wing scales of Lepidoptera.

both body and wings. The wings are usually of good size, and both pairs are used in flight. In the butterflies the primaries or forewings are as large or larger in area than the secondaries, in the moths the opposite is the case; but there are exceptions to both rules, and in some groups the females tend to lose the wings altogether. The head is connected with the thorax by a distinct neck, and the mouth parts are developed into a long, tube-like tongue coiled between the palpi when at rest and used only for sucking up liquid food. In the adult stage the insects are therefore

harmless, and the day fliers or butterflies add much to the beauty of the fields and roads by their bright coloring, when flitting from flower to flower in the sunshine.

In the early or larval stages the insects are caterpillars, with mouth parts formed for chewing, feeding mostly upon foliage or growing vegetation, and therefore injurious. Whenever they feed openly, arsenical or other stomach poisons are available against them, and indeed only in exceptional cases can any others be satisfactorily used.

Little has been added to the list in the "Macrolepidoptera" since the previous edition was published. A comparatively few species have been found whose presence was previously suspected or whose range has been somewhat extended by collections, but in the "microlepidoptera" there have been great changes. Since 1899 Dietz, Busck, Kearfott and others have described numerous species and have written revisions of genera that have changed the appearance of our lists. The work of these students has been incorporated and used, as appears under the special families to which they have contributed. While there will probably be many more species added in some of these families, they are in very much better shape than they were in the previous list, and include the species more likely to be found by the ordinary collector.

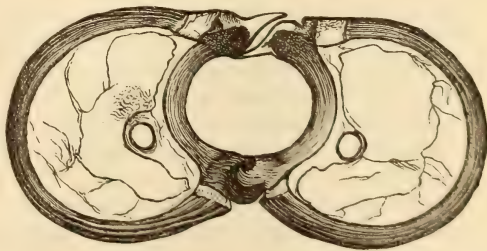


Fig. 172.—Section through a butterfly tongue, showing how it is made up and how the two halves are locked.

No important change in general arrangement has been made in this edition, and such changes as have been necessary are connected with the previous work in the usual way.

Super-family PAPILIONOIDEA.

Includes the day-fliers or butterflies, characterized by having the antennæ enlarged into a club at tip, whence they have also been called "Rhopalocera" or club-horned. They are usually of moderate or large size, brightly colored and marked, and the wings, when at rest, are held upright or vertical, the faces opposing each other, except in the skippers or "Hesperiidæ," where the fore-wings are held vertically and the hind wings are held horizontally.

Dr. Henry Skinner, of Philadelphia, has been good enough to look over the manuscript in this super-family and to verify such determinations as seemed questionable. He has also added a number of records and notes from his own experience.

Family NYMPHALIDÆ.

These are the four-footed butterflies, in which the anterior feet are so much aborted as to be useless for any purpose. The pupæ are suspended by the tail alone and are frequently ornamented by metallic gold and silver spots.

DANAIS Latr.

D. plexippus Linn. Occurs throughout the State, May to November; sparingly before midsummer, commonly until late September. The larva feeds on milkweeds, and there are three broods. The chrysalis is bright green with golden spots, and forms a conspicuous object. This butterfly migrates in late fall and winters as an adult in the Southwest. In May, scattering females return and provide for the first brood of larvæ, the butterflies from which remain here, lay eggs and provide for the second brood of larvæ. These develop in the same way, the adults also remain at home and provide for the third and largest brood of the season. The adults that hatch from this brood of larvæ have the migrating instinct developed, make no attempt to reproduce their kind and leave in great swarms in late September and early October for their winter home. They do not reproduce there, and only the females return to their place of birth in the spring following.

AGRAULIS Bd.—Lec.

A. vanillæ Linn. Cape May; 7-mile beach; Camden County; an occasional visitor only, and may not breed in the State at all; the larva feeds on "Passiflora."

EUPTOIETA Doubl.

- E. claudia** Cram. From Cape May to Jersey City and south of the red-shale line to the Delaware, June to October. There are three broods, and the larva feeds on violets, mandrake, passion flower, Portulacca, Sedum and Desmodium. Mr. Davis reports it extremely rare on Staten Island; but other collectors report it as locally and seasonally common.

ARGYNNIS Fab.

- A. idalia** Dru. Throughout the State and locally common, from late June into September, favoring swampy meadows. The form "ashtaroth" Fisher has been taken by Mr. Angelman at Schooley's Mountain. The larvæ of all the species of this genus feed on violets.
- A. cybele** Fab. Throughout the State from early June to late September; less numerous in the northern areas than in the south, where it is the most abundant of the larger species.
- A. aphrodite** Fab. Occurs with "cybele" north of the red shale line and more abundant in the hills of the extreme north. Mr. Davis records a single example from Staten Island, VI, 29. Records south of these points are Camden, Moorestown, Westville (Carney), but these may need verification.
- A. myrina** Cram. Common throughout the State, May to September and probably 3-brooded.
- A. bellona** Fab. Throughout the State, June to September; more common northwardly.

PHYCIODES Doubl.

- P. nycteis** Db.—Hew. Recorded from Hopatcong and Greenwood Lake to Mount Holly, all dates in June and July. Not usually a common species. Larva on aster, sunflower and "Actinomeris."
- P. tharos** Dru. Common throughout the State and throughout the season, probably three-brooded. The form "marcia" Edw. appears in May and June and produces the form "morpheus" Edw., from which, in turn, "marcia" again appears. The larva feeds on asters.
- P. batesii** Reak. Recorded only from Gloucester, in the original description and apparently not found since.

MELITÆA Fab.

- M. phæton** Dru. Throughout the State, in swampy meadows, sometimes locally abundant. The larva hibernates, becomes full grown in May or early June, and the adult is on the wing until early July. Food plants are "Lonicera," "Chelone," "Viburnum," "Mimulus," "Plantago," "Gerardia," etc.
- M. harrisii** Scudd. Orange Mts. (Soc); Schooley's Mt. (Aaron); Hewitt VI, 19 (Ds). The larva on asters.

GRAPTA Kirby.

G. interrogationis Fab. Occurs throughout the State and throughout the season; not uncommon. The adult hibernates, begins to oviposit in May and there are three broods. It occurs in two forms, "fabricii" and "umbrosa," which are not seasonal, but may and do occur together in midsummer. The larvæ feed on "Celtis," elm, hop, nettle, basswood and other trees.

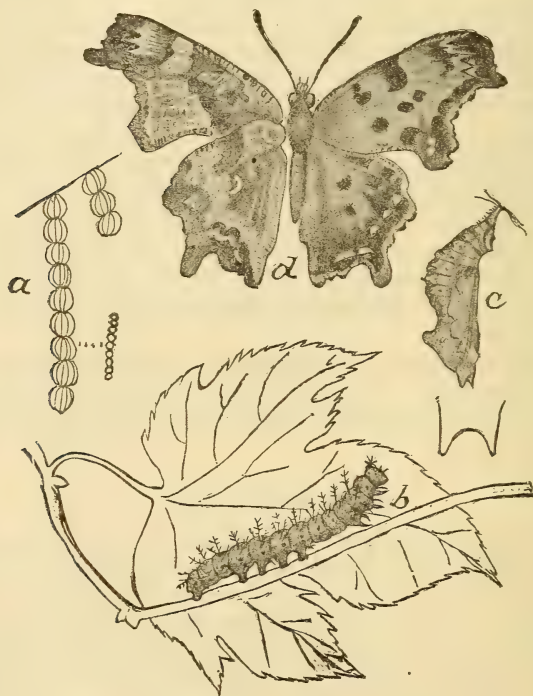


Fig. 173.—*Grapta comma*: a, egg chain; b, larva; c, chrysalis; d, adult: all natural size except a.

G. comma Harr. Also recorded from all sections of the State and throughout the season; but less abundant and more local. Also hibernates and occurs in two forms, "harrisii" (winter) and "dryas" (summer). Food plants are much as before, save that hop is the favorite. Mr. Grossbeck records it on false nettle near Paterson in September.

G. faunus W. H. Edw. Schooley's Mt. (Aaron), Westwood IX, 10 (Mitchell), and locally in the hilly sections of northern Jersey. The larva on birch, willow, currant and gooseberry.

- G. progne** Cram. Local throughout the northern half of the State; but a single ♂ has been recorded at Camden IV, 24, by Carney. Hibernated specimens occur in March and April and fresh examples in midsummer. The larva is recorded from currant and gooseberry.
- G. j-album** Bd.—Lec. Local throughout the State, though much more frequent northwardly. Lakehurst IX, 17 (Ds), and Barnegat City VIII, 16 (Br), are the most southern localities given, and as with the others there are two broods. Mr. Davis records that about one-half the specimens taken on Staten Island have been found in dwellings, and it is more apt to come within doors than any other of our native butterflies. The larva is recorded from birch.

VANESSA Fabr.

- V. antiopa** Linn. Common throughout the State and almost throughout the year, the hibernating examples being sometimes seen during mild days even in mid-winter. The spiny caterpillar feeds in colonies on willow, poplar, elm and celtis, and sometimes in numbers sufficient to attract attention. It is easily controlled by arsenites. The aberration "lintneri" has been taken at Camden VIII, 4, by Mr. Carney.
- V. milberti** Gdt. Orange Mts. and northward VI, VII and IX; one example only, recorded at Camden XI, 9 (Carney). Mr. Davis records two examples on Staten Island, both in October. Other specific localities are Lyons Farms VII (Bz); Swartwood Lake, VII, 25 (Ds); Schooley's Mt. (Aaron); Paterson, VII, 20, VIII, 13 (Gr). Larva on nettle.

PYRAMEIS Doubl.

- P. atalanta** Linn. Throughout the State and all seasons; locally common. Becomes most abundant in September and hibernates as an adult. Two-brooded, the larva on hop and nettle.
- P. huntera** Fab. Throughout the State, common, May to November and hibernating examples occasionally in other months. There are two broods, and the larva feeds on nettle, thistle, burdock, sunflower, everlasting, etc.
- P. cardui** Linn. Throughout the State, May to October, usually most abundant in September. Two-brooded, adult hibernates, food plants thistle, burdock, sunflower, hollyhock and others.

JUNONIA Doubl.

- P. coenia** Hbn. More or less generally distributed south of the red shale and sometimes common in late summer in Cape May and other southern shore counties. Occasional in the Orange Mts. (div); Ft. Lee (Bt); Paterson VIII, 22 (Gr). Westwood (Mitchell) and Somerset County. It is two-brooded; flies from May to November, and the larva feeds on plantain, snapdragon and Gerardia.

LIMENITIS Fabr.

- L. ursula** Gdt. More or less common throughout the State, May to September. The larva hibernates, becomes full grown early in May and produces adults late May and June. Second brood adults appear in late July and continue to September. Food plants are apple, plum, cherry, willow, poplar, oak, thorn, huckleberry, etc.
- var. **albofascia** Newc. Staten Island VIII, 25 (Ds); East Brunswick VII, 29 (Dow); Hoboken (Wr); Chester VIII (Dn). This variety has probably been mistaken for "arthemis" in times past, and by its complete white fascia it resembles that species quite strongly.
- L. arthemis** Dru. Schooley's Mt. (Aaron); Andover VIII (Kr). It is probable that this is occasionally found among the hills in the extreme northern parts of the State; the larva on willow and thorn.
- L. proserpina** W. H. Edw. An occasional companion of the preceding and generally believed to be a variety of it. Others believe it to be a distinct species, feeding on apple, and so I have listed it here.
- L. archippus** Cram. More or less common throughout the State VI-X. Hibernates as larva, which becomes full grown in May and produces adults in June; second brood from late July on. Larva on apple, plum, thorn, willow, poplar, oak, gooseberry, huckleberry, etc.

APATURA Fabr.

- A. clyton** Bd.—Lec. Larva numerous on "Celtis" at Maplewood (Doll).

Family SATYRIDÆ.

These are the woodland butterflies—modest gray or blackish species with eye-spots above and below and the veins at the base of the wings inflated. They are brush-footed as completely as the previous family, and the chrysalis is suspended by the tail alone. There are no injurious species.

DEBIS Westw.

- D. portlandia** Fab. Local throughout the State; not rare. Newfoundland VII, 27 (Ds); Paterson VII, 16, VIII, 17 (Gr); Elizabeth VII (Bz); 5-mile beach VII (Haim). There is only a single brood (Bt) and the larva feeds on grasses. Mr. Davis says the species is not found on Staten Island.

NEONYMPHA Westw.

- N. canthus** Bd. Lec. Occurs throughout the State, June to September, but hardly common. Specific records extend from Hopatcong to Cape May and in every summer month. The larva feeds on grasses. and Mr. Beutenmuller gives one brood only.

- N. phocion** Fab. 5-mile beach VI (Haim); 7-mile beach, Atlantic City (Aaron); DaCosta VII, 17, common (Lt); Toms River VII, 27. Brown's Mills Jc. VII, 12 (Dke); Jones Mill VI, 21 (Stone); Morristown (Edwards). The larva is said to feed on grasses.
- N. eurytus** Fab. Throughout the State in and around open woodland. It is the most common of our species and on the wing from late May to early September. Mr. Beutenmuller says there is one brood only, the larva feeding on grasses.
- N. mitchelli** French. Dover, VI (Jn), and no other more recent captures.
- N. sosybius** Fab. Mount Holly (Aaron), and occasional in southern New Jersey. The larva on grasses.

SATYRUS Westw.

- S. alope** Fab. Common throughout the State from June to September. The typical form occurs sparingly in the northern section—is the more common in the centre of the State and along the Delaware, and becomes less common in the sandy coastal plain.
- var. **maritima** W. H. Edw. This is the common form in Cape May County, VII-IX, is at least as common as the type at Jamesburg, but is rare in the Orange Mountains and wanting in the north.
- var. **nephele** Kirby. Tends to replace the typical form in the north and is common in Sussex, Warren and Morris Counties. All forms from typical "alope" to typical "nephele" occur at Chester. The larvæ are grass feeders.

Family LIBYTHEIDÆ.

Includes only a single species, which differs from all the rest of our butterflies by the long palpi, projected straight forward so as to give the appearance of a snout or beak.

LIBYTHEA Fab.

- L. bachmani** Kirtl. Local and sometimes common. Hopatcong (Pm); Ft. Lee VII and VIII (div); Newark (Soc); Staten Island VIII, 11, IX, 15, three specimens only (Ds); Gloucester (Aaron); Camden VII, 9 (Carney); Avalon VII, 4 (Kp); Lakehurst VII, 21 (Ds). The larva feeds on hackberry.

Family ERYCINIDÆ.

The forelegs in the male are aborted, in the female complete. The family is a small one at best, and has only a single representative in the State. It was called "Lemoniidæ" in the last edition.

CALEPHELIS Grt. & Rob.

- C. borealis* Grt. & Rob. Del. Water Gap (Aaron); Newton, VII, 18 (Wright); Springdale VII, 10 (Gr). More specimens of this species occurred in 1907 than were ever before taken in the State.

Family LYCÆNIDÆ.

These are the blues, coppers and hair-streaks, so named from the colors of the upper surface or the markings of the underside. They are small in size, with slender bodies and somewhat fragile wings. In the male the anterior tarsi are more or less aborted, but in the female they are complete. The caterpillars are often slug-like in form, the chrysalis is somewhat constricted centrally, and is girthed by a silken thread at the middle as well as fastened by the tail.

THECLA Fab.

- T. halesus* Cram. Cape May, Gloucester, Westville (Aaron); Newark (Soc); a southern species of very occasional occurrence. The larva on oaks.
- T. m-album* Bd.—Lec. Atlantic City (Aaron); Orange Mts. IV, 28 (Br); Lake Hopatcong VII, 5 (Franck); also a southern species. The larva on oak and "Astragalus."
- T. favonius* Sm. Abb. Anglesea (Sm), IX, 1 (Haim).
- T. melinus* Hbn. Locally, throughout the State, V-IX. Paterson VIII, 3-17 (Gr); Orange Mts. VII (Wdt); Staten Island V-IX (Ds); Elizabeth VII, VIII (Bz); Camden VI, 17, IX, 17 (Carney); 5-mile beach, VII, 4-20 (Haim); Cape May, IX (Sk). The larva feeds on hop and bean and is two-brooded (Bt).
- T. acadica* W. H. Edw. Hewitt VI (Jtl); Greenwood Lake VI (Bt). The larva on willow.
- T. edwardsii* Saund. Newark VII, 4, abundant (Br); Newfoundland VII, 3 (Ds); Hewitt VI (Jtl); Jamesburg VII, 4.



Fig. 174.—*Thecla melinus*; c, adult from above; d, same with wings closed showing under surface; a, larva; b, pupa; all somewhat enlarged; e, egg, greatly enlarged.

- T. calanus** Hbn. Throughout the State. Hopatcong VII, 4, abundant about hickory; Paterson VI, 24, VII, 4 (Gr); Newark V-VIII (div); Elizabeth VII (Bz); Staten Island VI, VII (Ds); Jamesburg VII, 4 (Sk); Camden VIII, 1 (Carney); 5-mile beach VII, 3 (Haim). Single brooded (Bt), the larva on oak, hickory, chestnut, walnut.
- T. liparops** Bd.—Lec. Westmont VII (Mitchell); Newark (Soc); Elizabeth (Bwl); Jamesburg VII, 4; Lakehurst VII, 21 (Ds); 5-mile beach VII, 17-26 (Haim). The larva on oak, holly, thorn, plum and apple. The variety "strigosa" occurs with the type.
- T. damon** Cram. Throughout the State, locally common. Westmont V, 19, 20 (Mitchell); Plainfield, Passaic Valley, Greenwood Lake, Lake Hopatcong, Del. Water Gap, only where red cedar grows, V, VI and VIII (Bt); Orange Mts. IV, 25-VIII, 1 (div); Paterson V, 11-VII, 27 (Gr); Morris Plains (Jn); Staten Island V, 8 (Ds); Laurel Springs IV, 29 (Hoyer); 5-mile beach VII (div). Food plants for larva are cedar and "Smilax rotundifolia."
- var. **patersonia** Brehme. Type locality Paterson VII, 25 (Gr).
- T. cecrops** Fab. Manasquan VI, 29 (Brehme); 1 ♂ only.
- T. augustus** Kirby. Paterson IV, 8, 22; Milltown IV, 29, abundant (Gr); Hemlock Falls IV, 30, V, 30 (Bz); Staten Island, IV and V, formerly abundant, but of late years more rare (Ds); South Amboy (Bt); Jamesburg V (Sm); Gloucester, Westville IV, 25 (Sk); Mt. Holly (Aaron); Clementon V, 10 (div); Laurel Springs IV, 29 (Hoyer).
- T. irus** Gdt. Orange Mts. IV and V, not rare (div); Staten Island IV and V (Ds); Gloucester, in pine woods IV, V (Aaron); Westville V (Sk); Clementon V, 16 (Jn); Anglesea, common V, 1 (Lt); 5-mile beach IV, 26-VI (Haim); Jamesburg V (Sm). The larva feeds on wild plum and huckleberry.
- T. polios** Cook & Watson. Type locality Lakewood IV, 21 and 27; also taken at Lakehurst in April and May by Davis and Grossbeck; Milltown IV, 22 (Gr); Brown's Mills V, 12, Manumuskin IV, 29, Lucaston IV, 10 (Dke). Larva on bear-berry "Arctostaphylos uva-ursi" (Cook).
- T. henrici** Grt. & Rob. Staten Island V, 23 (Br); South Amboy (Bt); Jamesburg V (Sm); Westville (Aaron). The larva feeds on plum and cherry.
- T. niphon** Hbn. In pine woods IV and V (Bt); common in May, 1881, along a sandy road and none have been seen since, Staten Island (Ds); Jamesburg V (Sm); Gloucester, Mount Holly (Aaron); Westville IV, 29, Camden VI, 18 (Sk); Riverton (Jn); Clementon V, 9 (Lt); 5-mile beach V, 7 (Haim). The larva feeds on pine.
- T. titus** Fab. Westmont VII, 8-29 (Mitchell); Dover VII, 16 (Jn); Lake Hopatcong (Pm, Bt); Paterson VII, 17 (Gr); Snake Hill (Bt), Jamesburg VII, 4 (div); Staten Island VII, VIII (Ds). The larva feeds on plum and wild cherry.

FENISECA Grt.

- F. tarquinius** Fab. Occurs throughout the State, but is local and nowhere common. The larva is one of the few predatory caterpillars and feeds on "*Schizoneura tessellata*," one of the woolly lice on alder. It is found throughout the summer and Mr. Beutenmuller records three broods.

CHRYSOPHANUS Doubl.

- C. thoe** Bd.—Lec. Local and not common in the northern part of the State; Schooley's Mt. (Aaron); Paterson VI, 12, VIII, 3 (Gr); Newark district IX (div); Secaucus, on salt meadows (Sb); Elizabeth IX (Bz); Staten Island VI, 20, IX, 12 (Ds). Mr. Beutenmuller records two broods, VI and VII and VIII and IX. The larva on "*Polygonum*" and "*Rumex*."
- C. epixanthe** Bd.—Lec. Newark 1 specimen (Erb); Jamesburg VII, 4 (div); DaCosta (Aaron); Brown's Mills Jc. VI, 17 (Dke); Lakehurst, common in swamps where there are cranberry plants (Ds).
- C. hypophlæus** Bdv. Common throughout the State from May to October. This is the common little copper butterfly that flutters about in fields everywhere; the larvæ on sorrel and clover, but never in injurious numbers.

LYCAENA Fab.

- L. ladon** Cram. (*pseudargiolus* Bd.—Lec.) Common throughout the State, but somewhat local. The forms "*lucia*" Kirby, "*marginata*" Edw., and "*violacea*" Edw., occur in April and May; the forms "*neglecta*" Edw., and "*pseudargiolus* Bd.—Lec., are found throughout the summer and until September. According to Beutenmuller the winter form lays eggs in the flower of dog-wood, "*Cornus florida*;" the following brood oviposits on the flower stem of black snake-root "*Cimicifuga racemosa*;" the fall brood occurs on "*Actinomeris*." Other recorded food plants are wild bean, "*Apios tuberosa*," "*Spiræa*," "*Ceanothus americana*" and "*Ilex*."
- L. comyntas** Gdt. The commonest of our little blues, occurring everywhere from May to September. There are three broods during the season, the larva on clover, "*Lespedeza*," "*Desmodium*" and "*Phaseolus*."

The two species, "*couperii*" Grt., and "*scudderii*" W. H. Edw., recorded in the last edition as probably occurring in New Jersey, have not been actually taken in the thorough collecting that has been done in the State and are therefore omitted.

Family PIERIDÆ.

This family includes the "cabbage butterflies," and among them are the most serious pests of this series. The butterflies are white or yellow, of good size, the wings generally more or less black-bordered and with black discal spots. The fore tarsi are complete in both sexes, hence these, in common with the following families, are six-footed butterflies. The chrysalis is angulated and girthed at its middle as well as fastened at the tail.

The caterpillars are cylindrical, usually green, often velvety in appearance, without spines or other processes. Some feed on cabbages and cruciferous plants generally, others on clovers and leguminous plants. When these caterpillars occur on cabbage and similar cultivated plants they may be dealt with by arsenites, applied early in the season. If Paris green is used there should be one pound of resin soap to each 100 gallons of water to give better adhesion. If arsenate of lead is used it should be applied with force in a fine spray; but even here the soap will be an advantage.

PIERIS Schrank.

P. protodice Bdv. Occurs throughout the State south of the red shale line and sometimes a little to the north of it. Lake Hopatcong (Pm) and Paterson VII, 22-30 (Gr), are the only records from the northern part of the State. Some seasons it is very common throughout its range, and then for several years in succession only isolated examples are seen, or it may be entirely absent.



Fig. 175.—*Pieris protodice*: female adult; natural size.

The variety "vernalis" W. H. Edw., has been taken at Paterson VII, 26 (Gr); Riverton IV, 16 (Jn); Camden V (Carney) and 5-mile beach V (Haim).

Eggs were found on pepper plants by Mr. Grossbeck VIII, 28, and cruciferæ generally are known as food plants of the species.

P. oleracea Bdv. Paterson V, 5 (Gr); Camden (Carney); occurs occasionally throughout the State, but more frequently in the northern portion. It is our native cabbage butterfly, which has been almost exterminated and driven out by the imported species. Only occasional examples are now found by collectors; in some years none at all.

P. rapæ Linn. March to November, throughout the State. This is the common cabbage butterfly, introduced from Europe, and which has

replaced the native species. The larva is always abundant on and sometimes very injurious to cabbage, cauliflower and other cruciferous plants. It is kept in check by applications of arsenical poisons.

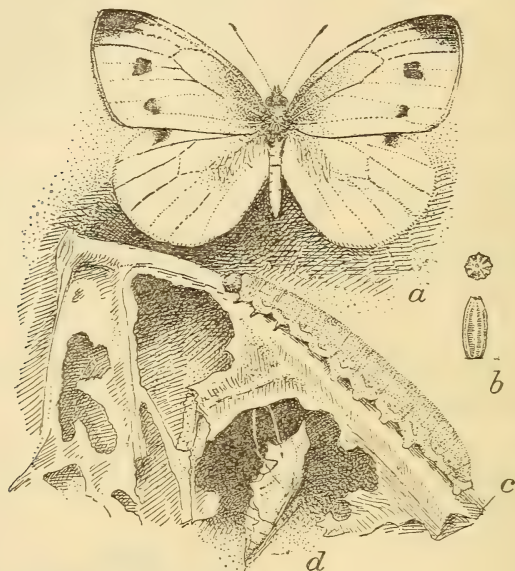


Fig. 176.—The cabbage butterfly, *Pieris rapæ*: *a*, female adult; *b*, egg from top and side; *c*, larva; *d*, chrysalis: *a*, *c* and *d* slightly enlarged; *b*, greatly enlarged.

var. *immaculata* Sk. & Aaron. Riverton IV, 16 (Jn); Paterson V, 2 (Gr). This is a spring form in which the spots are much reduced or wanting, and which has been mistaken for "oleracea."

ANTHOCHARIS Bdv.

A. genutia Fab. Local; throughout the State in April and May. Del. Water Gap, Ramapo Mts. (Bt); Great Notch V, 7, Little Falls V, 14 (Ds); Paterson IV, 27–V, 20, eggs on "*Arabis lyrata*" V, 11–18, larvæ V, 19–VI, 26 (Gr); Orange Mt. Dist. (div); Westville, Mt. Holly, 7-mile beach (Aaron); Timber Creek, Riverton (Jn); Laurel Springs IV, 29 (Hoyer). The larva feeds on "*Arabis*" and "*Sisymbrium*."

CATOPSILIA Hbn.

C. eubule Linn. Occasionally common in September in the southern seashore counties and flies northward for long distances. It is recorded from Chester (Dn), Ft. Lee (Bt), Newark (div), Staten Island (Ds), and many points to the southward. It is our most conspicuous and largest butterfly of this family, and the larva feeds on "*Cassia*," which is very abundant in Cape May County.

COLIAS Fab.

- C. caesonia* Stoll. The "dog's head butterfly." Taken on Staten Island in June and July, 1896, and not since recorded. It is common further south and west, and the larvæ feed on clover and "Amorpha."
- C. euytheme* Bdv. Mt. Holly (Aaron); Camden (Carney); Long Island (Bt); Staten Island X, 20, 1900 (Ds). Very occasional and hardly a regular inhabitant of the State. It is common in the Central States, and the larvæ feed on clover and allied plants.
- C. philodice* Gdt. The common sulphur yellow butterfly, which occurs throughout the State from early spring to late fall. The larva feeds on leguminous plants, preferably clover, and while quite abundant, has never yet become injurious.

TERIAS Swains.

- T. nicippe* Cram. Local throughout the State, rarely common, in May and June and again in September and October. Specific records are Orange Mt. Dist. (div); Waverly (Br); Elizabeth IX, 14 (Gr); Staten Island VI (Ds); Mt. Holly, Westville, Atlantic City (Aaron); Camden (Carney); 5-mile beach (Haim). The larva feeds on clover and "Cassia."
- T. lisa* Bdv.—Lec. Throughout the State; but rather local and rarely common north of the red shale. It is the most common butterfly at Anglesea and along the shore in Cape May County in September, occurring generally where its food plant, "Cassia," is plentiful. The early butterflies in June, the later broods in August and September. Belated examples have been taken in October, and there is no time during the summer when it is not likely to be met with along shore.

Family PAPILIONIDÆ.

These are the swallow-tail butterflies; all of them of large size, conspicuously marked, the hind wings with a tail-like extension, which gives them their common name. The legs are all complete, fitted for walking, and the antennæ are situated close together on the vertex. The caterpillars are unique in the possession of a protrusible fleshy process between the thoracic segments which, when extended, gives off an intensely disagreeable odor. These processes are called "osmateria," and are supposed to be defensive in character. The chrysalids are girthed at the middle as well as fastened at the tail.

PAPILIO Linn.

- P. ajax* Linn. Local throughout the State, but usually only single examples at long intervals. The larva feeds on paw-paw, and wherever this food plant does not occur the butterfly is a visitor merely. Specific records are from Newfoundland VII (Ds); Hemlock Falls VII, 1 (Br); Newark district (div); Staten Island VI, VII, VIII (Ds); Anglesea (W).

- P. philenor** Linn. Throughout the State, sometimes common; the larva on the "Dutchman's pipe," "*Aristolochia siphon*," which it sometimes defoliates completely. There are three broods and specimens occur from May to October; one record, by Mr. Davis, as late as November 2.
- P. polyxenus** Fab. Throughout the State, April to October, and the most common of our swallow-tail butterflies. The larvæ feed on carrot, parsley, celery and similar plants, and are sometimes abundant enough in gardens to be injurious. Hand-picking is usually the most satisfactory method of control, though arsenate of lead is effective where it can be safely used.
- P. palamedes** Dru. Fairview, fide Wrms. A ragged specimen, visitor rather than native.
- P. troilus** Linn. Not rare throughout the State, April to October, wherever the food plants occur. Feeds on sassafras, spice-bush and "*Laurus*."
- P. turnus** Linn. Throughout the State, sometimes common, May to September. It is the largest of our common butterflies, conspicuous by its yellow color and black transverse bands. There is a black variety of the female, known as "*glaucus*," which is rare in New Jersey, but more abundant to the south and west. The larva feeds on a great variety of orchard and other trees, but is never plentiful enough to cause injury.
- P. thoas** Linn. Very occasional throughout the State and even larger than the "*turnus*." Records of actual captures are from Paterson VIII, 12 (Gr); Ft. Lee (Bt), Newark and Orange Mts. (div); Staten Island VIII, IX (Ds); New Brunswick (Sm); Trenton (Aaron). The larva feeds on orange, prickly ash and hop-tree (*Ptelea*); in Florida it is known as the "Orange dog."

Family HESPERIDÆ.

These are the "skippers," so called because of their low, jerky flight. They are usually small, stout butterflies, with tawny, black or smoky wings, which may or may not be spotted or marked with black or white. The head is broad between the eyes, the antennæ are widely separated at the point of insertion, their club gradual and pointed, usually a little recurved at tip. All the legs are fully developed. At rest these butterflies have the forewings vertical as in the preceding families, but the hind wings are held horizontally.

The larvæ have large heads, separated by a distinct neck from the rest of the body, and they feed mostly on grasses, none of them being of economic importance. The pupæ are rounded, usually more or less incased in a slight cocoon and thus somewhat resembling the moths.

ANCYLOXYPHA Field.

- A. numitor** Fab. Common throughout the State, May to September; the larva three brooded, feeding on grasses.

PAMPHILA Fab.

- P. massasoit** Scudd. Westmont VII, 8-VIII, 7 (Mitchell); Paterson VII, 7 (Gr); Staten Island VII, VIII (Ds); Elizabeth VII, in fresh water swamps (Bz); Jamesburg VII, 4 (div); Camden (Carney); Gloucester VII, VIII (Aaron); swamp near Westville VII, 3-10 (Sk, Lt).

var. *suffusa* Laurent. Westville VII, 4.

- P. zabulon** Bd.—Lec. Quite generally distributed, but seems local and not common. Westmont VIII, 28 (Mitchell); Paterson VI, 8, 14 (Gr); Newark and Orange Mts. V, 29-VI, 10, VIII, IX, 10 (div); Staten Island V, VI, VIII, IX, X (Ds); Cape May V, 30 (Sk); 5-mile beach VI, 19-VIII, 21 (Haim).

- P. hobomok** Harr. Westmont V, 28-VII, 5 (Mitchell); Paterson, V, 11 (Gr); Staten Island V, VI, VII (Ds); Newark V, 15-VI, 15 (Bz); and probably local throughout the State.

var. *pocahontas* Scudd. Sometimes common in the hilly portions of the State in May and June.

- P. sassacus** Harr. Hopatcong (div); Westmont VI (Mitchell); Newfoundland V, 29; Staten Island V, VI (Ds); Newark and Orange Mts. V, VI (div); Plainfield (Sk); Trenton (Ds).

- P. metea** Scudd. Schooley's Mt. (Aaron); Westmont V, 19 (Mitchell); Hemlock Falls V, 15 (Sb, Bz); Staten Island VI, Newfoundland V, 19-27, Lakehurst V, 20-27 (Ds); Clementon V, 10, on sand myrtle (div).

- P. attalus** W. H. Edw. Lakehurst VII, 17 (Bz); Clementon VIII, 3 (Fox); DaCosta VII, 19 (W); Manumuskin (Dke).

- P. leonardus** Harr. Quite generally distributed, but not common, in August and September. Records are from every section of the State.

- P. campestris** Bdv. Hopatcong (Pm); Newark (Soc); Camden VIII, IX (Carney); Mt. Holly (Aaron); Cape May IX (Sk); 5-mile beach VII, 26, IX, 20 (Haim); locally common.

- P. phylæus** Dru. Hopatcong VIII, 29 (Ds); Bayonne X (Bt); Atlantic City (Aaron); 5-mile beach VIII, 20 (Haim); not common.

- P. brettus** Lec. Camden 1 ♀ VIII, 10, 2 ♂ IX, 7 (Carney).

- P. otho** Sm. Abb. and its var. "egeremet" Scudd. Quite general throughout the State and locally common. Hopatcong (Pm); Newfoundland VII, 5, Staten Island VI, VII (Ds); Newark Dist. (div); Camden. Merchantville VII (Carney); Gloucester (Aaron); Lakehurst VII, 29 (Ds); 5-mile beach VI, 3, VIII, 27 (Haim).

- P. peckius** Kirby. Common throughout the State from May to September; two brooded.

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- P. mystic** Scudd. G. d. throughout the northern part of the State, V, VI, and again VIII, IX (Bt); Orange Mts. and Newark Dist. (div); Elizabeth VI (Bz); Staten Island VI (Ds); Trenton, Schooley's Mt. (Aaron).
- P. cernes** Bd. Lec. Common throughout the State V-IX; two brooded.
- P. manataqua** Scudd. Westmont VII (Mitchell); Newark (Soc); Staten Island V, VI, VII (Ds); Elizabeth VI, 20-VII, 30 (Bz); Camden, Merchantville VII, VIII (Carney); Gloucester (Aaron). Local and nowhere common.
- P. verna** W. H. Edw. Hopatcong, Ft. Lee Dist. VI, VII in meadows (Pm); Westmont VII, 8 (Mitchell); Orange Mts. V, VII (Wdt); Elizabeth VI, 20-VII, 30 (Bz); Staten Island VI, VII (Ds); 5-mile beach, VI, 23, VIII, 12 (Haim).
- P. metacomet** Harr. Throughout the State from June to August, records ranging from Hopatcong to Cape May.
- P. accius** Sm.—Abb. June and July (Bt); Salem (Aaron).
- P. maculata** W. H. Edw. Camden VII, 15, 1 ♂ and 1 ♀ (Carney).
- P. panoquin** Scudd. Common on the salt marshes from Tuckerton, south to Cape May, June to September; taken by all collectors.
- P. ocola** W. H. Edw. Staten Island IX, 1896, once only (Ds); Salem (Aaron); Camden IX, 1899, common; never seen before (Carney).
- P. bimacula** Grt. & Rob. Oak Ridge VI, 26, VII, 3 (Shoemaker); Lakehurst VI, 27 (Ds).
- P. pontiac** W. H. Edw. Hopatcong, Snake Hill VI, VII (Bt); Westmont VII, 4-28 (Mitchell); Staten Island VII, VIII (Ds); Elizabeth VII (Bz); Jamesburg VII, 4 (Lt); Camden, Merchantville (Carney); Westville VII, 4 (Sk); Gloucester IX (Lt).
- P. dion.** W. H. Edw. Brookville VII, Lakehurst VII, 29 (Ds); Brown's Mills IX, 15 (Dke); Anglesea VII (div).
- P. vitellius** Fab. Rare near New York (Bt); Jamesburg VII, 30 (Ds); Westville VII, 10 (Lt); east bank of Delaware Bay near Maurice River (Aaron).
- P. aaroni** Sk. Common on the salt marshes from Tuckerton south to Cape May, on Convolvulus VI and VIII; recorded by all collectors.
- P. arogos** Bd. Lec. Brookville VII, Lakehurst VIII, 30 (Ds); Brown's Mills VII, 21 (Dke).
- P. fusca** Grt. & Rob. Orange Mts. IX (Wdt); Elizabeth VI (Bz); Staten Island VI, Sandy Hook, Tuckerton IX, 2 (Ds); Jamesburg VI, 22 (Ds), VII, 4 (Sk); Camden VI, 18 (Sk); 5-mile beach VI, 9, VIII, IX (div).
- P. hianna** Scudd. Iona, Brown's Mills V, 27 (Dke).
- P. viator** W. H. Edw. Hopatcong (Pm); Snake Hill, Newark VII (Bt); Homestead VII (Kr); Elizabeth VII (Bz); Staten Island, VII, 17-31, not uncommon at the edge of salt meadow (Ds); Middlesex Co. (Hulst); Cape May (Aaron).

AMBLYSCIRTES Speyer.

- A. vialis* W. H. Edw. Newfoundland V, 29, Lakehurst V, 20, VI, 4 (Ds); Westville V (Sk); Clementon V, 16 (div).
A. samoset Scudd. Not yet actually taken; but almost sure to be found.

PYRGUS Westw.

- P. tessellata* Scudd. Throughout the State, seasonally common, VIII and IX. The larva on mallow, "Althea," "Abutilon" and "Sidus."
P. centaureæ Ramb. Westmont IV, 30-V, 19 (Mitchell); Paterson IV, 25-V, 14 (Gr); Little Falls throughout May (div); Iona IV, 30 (Sk).

NISONIADES Speyer.

- N. brizo* Bd.—Lec. More or less common throughout the State, April to June, recorded by all collectors. There is one record at Clementon X, 5 (Sk), and Mr. Davis adds that the species occurs on the more barren hills and sandy districts. Larvæ on oak and "Cynoglossum."
N. icelus Lint. Del. Water Gap (Aaron); Ft. Lee, Plainfield V, VI (Bt); Orange Mts. V, 1-VI, 15 (Bz); Jersey City VII (Kr); Staten Island V (Ds). The larva on aspen, willow and witch hazel.
N. lucilius Lint. Greenwood Lake, Orange Mts. V, VI (Bt); Paterson IV, 19-V, 7 (Gr). The larva on "Aquilegia," "Chenopodium" (Bt), willow and poplar (Dyar).
N. persius Scudd. Westmont VIII, 6 (Mitchell); Greenwood Lake and elsewhere in N. J., V, VI (Bt); Orange Mts. V-VII (Bz); Staten Island V-IX (Ds); So. Orange, Camden VII (Bwl); Westville IV, 9 (Sk). The larva on willow and poplar.
N. martialis Scudd. Westmont VII, 4 (Mitchell); Sparta, Normannock VII, Staten Island V, 3 (Ds); Paterson VII, 27 (Gr); Eagle Rock VI (Bz); Laurel Springs IV, 29 (Hoyer); Woodbury IX, 5 (Sk); New Jersey V, VI and VII, VIII, two broods (Bt). The larva on red-root and wild indigo. The "ausonius" Lint. of the last edition is an undersized example of this species.
N. juvenalis Fab. Throughout the State, more or less commonly, May to September. Two broods; larva on wild beans and other legumes as well as on oak.
N. petronius Lint. Orange Mts. VII, VIII (Bz); Woodbury IV, V, Jamesburg VII, 4, Atco IX, 4 (Sk).

"*N. horatius*" Scudd. and "*N. terentius*" Scudd. included on published faunal maps, have not been actually taken and are of doubtful occurrence.

PHOLISORA Speyer.

- P. catullus* Fab. Common throughout the State, May to September. It is two-brooded, the larva on "Amaranthus" and "Chenopodium."

EUDAMUS Swains.

- E. pylades* Scudd. Quite generally distributed, from late May to mid-August; the larva on clover and "Lespedeza."
- E. bathyllus* Sm. Abb. Common locally throughout the State, May to September; the larva on "Lespedeza," wild bean and other legumes.
- E. lycidas* Sm. Abb. Throughout the State, locally common, May to July. Larva on "Desmodium" and legumes in general.
- E. cellus* Bd. Lec. Taken rarely near Newark; the larva on *Convolvulus*.
- E. tityrus* Fab. Throughout the State, May to September, not rarely. The larva on locust and other legumes.
- E. proteus* Linn. Newark (Soc); 5-mile beach (Haim); Cape May (Aaron); occasional specimens only. The larva on wild bean and other legumes.

Super-family SPHINGOIDEA.

These are the "hawk-moths," so called from their rapid darting flight, and habit of remaining poised in the air for a time, in front of a flower. They are usually crepuscular, flying in the early twilight, hovering over deep flowers like petunia or evening primrose, into which they extend their long flexible tongue to reach the nectar at the base; but some species fly in the bright sun of mid-day. They are of moderate or large size, robust build, with usually pointed wings, conic abdomen, and antennæ that are fusiform, prismatic and with a short, recurved tip. In some species the tongue is nearly six inches in length when fully uncoiled, but in others it disappears completely.

The larvæ are as characteristic as the adults, and most of them have a curved horn on the dorsal segment of the end segment, or, in place of it, a polished, eye-like spot. They look formidable, but are actually harmless, and it is from their habit of sometimes resting with head and anterior segments elevated, that they get their "sphinx" appellation.

A few of the species are of economic importance, but as a rule they are kept in check by their parasites and other natural enemies. All of the caterpillars are susceptible to arsenical poisoning.

Family SPHINGIDÆ.

Sub-family MACROGLOSSINÆ.

These are the "humming-bird" hawk-moths, in which the wings are partly transparent, the colors are metallic bronze or brown and yellow, and the abdomen has lateral and terminal flattened tuftings. They fly in the bright sunlight about flowers, favoring lilacs while these are in bloom, and are often mistaken for true humming birds.

HEMARIS Dalm.

- H. diffinis** Bdv. Throughout the State, not rare; the larva on "Apocynum" and "Symphoricarpus." The forms listed as "tenuis" Grt., and "axillaris" Grt. & Rob., are now generally regarded as varieties of this species. They seem rather more frequently met with in the northern half of the State.
- H. gracilis** Grt. & Rob. Hopatcong (Pm); Lakewood (Bt); Brown's Mills V, 27 (Dke).
- H. thysbe** Fab. Generally distributed and not uncommon from May to August; the larva on "Viburnum," sheepberry, honeysuckle and snowberry. The varieties "ruficaudis" Kirby (which replaces "uniformis" Grt. & Rob.) and "floridensis" Grt. & Rob., are somewhat less abundant than the type form; but equally widespread. Mr. Beutenmuller records that he has never raised the "thysbe" form from "uniformis" larva, and Mr. Davis records "uniformis" in May and June only, while "thysbe" is taken in July and August only.

Sub-family CHÆROCAMPINÆ.

A considerable proportion of the members of this sub-family feed in the caterpillar stage upon the vine or plants allied to it, and some are more or less injurious.

AELLOPOS Hbn.

- A. tantalus** Linn. A southern species, which sometimes occurs along the coast.

TRIPTOGON Men.

- T. lugubris** Linn. (Enyo) Also a visitor from the South; Bergen Point, IX, 24 (Wrms), and has been taken at electric lights at Long Branch and Asbury Park.

AMPHION Hbn.

- A. nessus** Cram. Throughout the State in May and June and locally common on flowers; at Anglesea on blue flag (Lt). The larva feeds on grape, Virginia creeper, "Fuchsia" and "Epilobium."

SPHECODINA Blanch.

- S. abbotii** Swains. Not uncommon, locally, May to July, throughout the State. Mr. Brehme records eggs from May 5, larvæ to July 5. Food plants are grape and Virginia creeper, and the ugly dull brown larva is quite familiar to collectors wherever these plants occur.

DEIDAMIA Clem.

- D. inscripta** Clem. Generally distributed; but rarely abundant. The adult is seldom taken; but larvæ may be locally plentiful on grape and Virginia creeper. Flies in June.

DEILEPHILA Ochs.

- D. gallii** Rott. Newark (Soc); Hudson Co. VIII (Kr); Caldwell (Cr); Passaic Co. VIII, 2 (Wrms); seems to be confined to the northern sections of the State and not really common anywhere. The larva on grape and Epilobium.

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- D. lineata** Fab. Common throughout the State, July to November about flowers in the early dusk. The larva feeds on a great variety of plants, including many of economic importance; but is most usually found on purslane; yet never in sufficient numbers to do the slightest injury to the crop of that omnipresent weed.

THERETRA Hbn.

- T. tersa** Linn. (*Choerocampa*) Staten Island on Petunias, V, VI, VIII, IX (Ds); Newark, V to IX (div); Hudson Co. VIII, on Phlox (Kr); Caldwell (Cr). Is locally common but is not widely distributed. The larva on "Bouvardia" and buttonwood.

ARGEUS Hbn.

- A. labruscæ** Linn. An occasional visitor from the south.

PHOLUS Hbn. (PHILAMPELUS Harr.)

- P. linnei** Grt. & Rob. Greenwood Lake, VIII, 31 (Wrms); occasional along the coast.
- P. vitis** Linn. Has been taken by Newark collectors and occurs occasionally along the coast.
- P. pandorus** Hbn. Throughout the State, June to September, and Mr. Davis records an example from Staten Island in early November. The larvæ feed on grape and *Ampelopsis* from June to October, eggs being recorded by Brehme in June and July.
- P. achemon** Dru. Occurs with the preceding and on the same food plants. The moths are occasionally attracted to light and the larvæ of both species are easily recognizable by the absence of the horn, its place occupied by an eye-spot, and the retractile head and anterior segments. These characters are shared with the larvæ of the next genus; but the latter are much smaller.

AMPELOPHAGUS Brem. & Gray.

- A. choerilus** Cram. Common throughout the State from May to August, two broods being noted. Eggs may be found from May to August according to Brehme, and the larva feeds from 20 to 30 days on "Azalea," "Viburnum," sheep-berry, sour gum and other plants.
- A. myron** Cram. Common throughout the State May to August, and sometimes attracted to light. Eggs are found during the same period and larvæ occur on grape and *Ampelopsis* until early September. The variety "cnotus" Hbn. has been taken on 5-mile beach VIII, 2 (Hmb) and occurs in the more southern sections.
- A. versicolor** Harr. Local, but generally distributed and never common, May to August. There are two broods, the larva on buttonball (*Cephalanthus*) and "Nesæa verticillata." Mr. Grossbeck records it at Paterson as late as September 10.

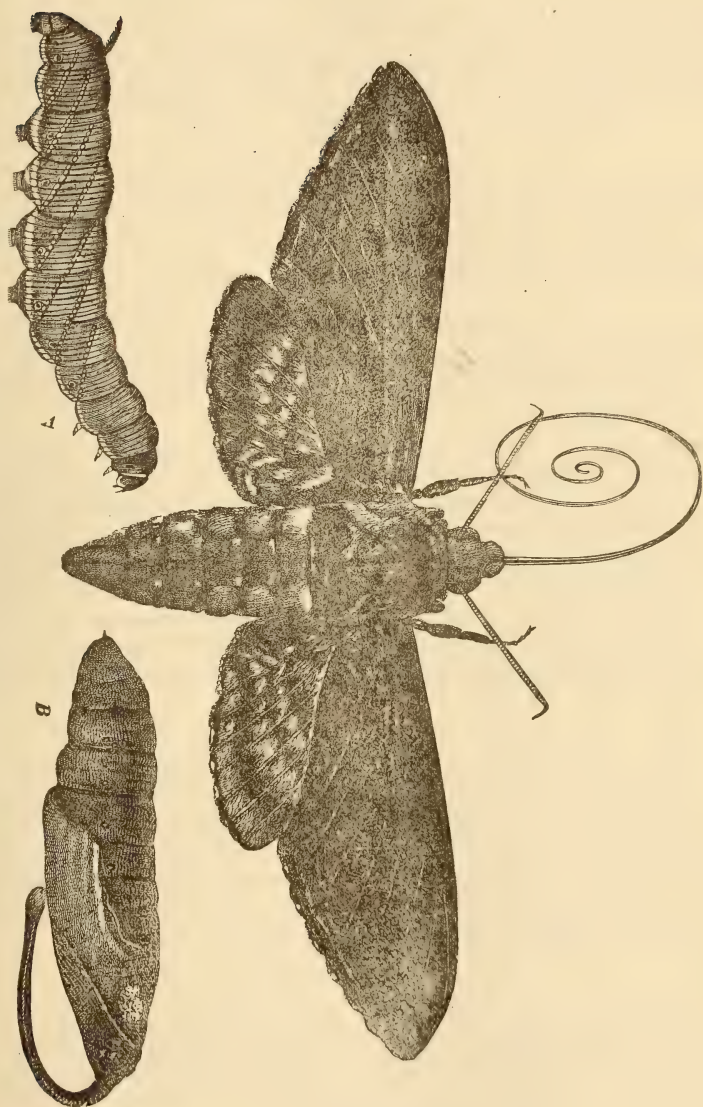


Fig. 177.—The potato hawk-moth, *Phlegothontius celeus*, larva, pupa and adult: about natural size.

Sub-family SPHINGINÆ.

This includes the more typical, gray-powdered hawk-moths, the caterpillars of which are all provided with anal horns and often have lateral oblique stripes. The head and anterior segments of the body are not retractile and none of them occur on grape or "Ampelopsis."

DILOPHONOTA Burm.

- D. ello** Linn. A visitor from the South, occasionally taken in some numbers by the Newark collectors; Elizabeth VII, 20 (Bz). The larva, according to Dyar, feeds on "Euphorbia."
D. alope Dru. Elizabeth IX, 27 (Bz); also a visitor.

PHLEGETHONTIUS Hbn.

- P. celeus** Hbn. (Protoparce) Throughout the State, VI-IX, rarely common; this and the following are potato or tomato "worms" in the larval stage.
P. carolina Linn. With the preceding, but more common. These "horn-worms," as the larvæ of these two species are often called, feed on "Solanaceæ" of all kinds and are sometimes decidedly troublesome, less so on potatoes, which are generally sprayed with Paris green or bordeaux mixture, than on tomatoes, where these poisons cannot be satisfactorily or safely applied. In these cases hand picking is quite generally resorted to with good results, as the insects are quite readily seen with a little practice, and they are not so very numerous. The large size of the individual accounts for the amount of injury rather than the number of examples.
P. rustica Fab. A single specimen taken by myself at Union Hill and another recorded by Mr. Davis for Staten Island at electric light. The species is an inhabitant of the State, but extremely rare. The larva feeds on "Chionanthus" and "Jasminium."
P. cingulata Sm. & Abb. Generally distributed but nowhere abundant. The larva feeds on morning-glory, sweet-potato and other "Ipomæa" and "Convolvulus" species until late in fall. Mr. Brehme records a full-grown example on morning-glory, October 10.

SPHINX Linn.

- S. kalmiæ** Sm. & Abb. Newark Dist. V-VII; Paterson (Gr); Staten Island VIII (Ds); Palisades, Elizabeth, VI, VIII, IX (Bz); throughout the State in all probability. Eggs have been found from late June to early August and larvæ from June to early September. It feeds on ash, lilac, laurel and "Chionanthus."
S. drupiferarum Sm. & Abb. Essex Co., May to August (div); Lake Hopatcong (Pm); Staten Island VI (Ds); and probably generally distributed. Eggs are recorded in V and VI (Br) and larvæ until VIII. Food plants are lilac, cherry, apple, plum, &c., plum being a favorite food and sometimes slightly injured.

- S. gordius** Cram. Essex and Union Co. V-VII (div); Hopatcong (Pm); probably throughout the State and locally not rare. Mr. Brehme reports eggs V-VII and larvæ until frost on huckleberry, bayberry and birch. Other recorded food plants are ash, apple, privet, &c.
- S. luscitiosa** Clem. Essex Co. V, 20-VI, 20 (div); Passaic VII, 29 (Wrms); Elizabeth V, 20-VI, 25, second hatch about VIII, 1, no eggs or larvæ from these (Bz). Eggs are recorded on willow from V, 16 (Br) to VI, 21 (Wrms); larvæ until late July.
- S. chersis** Hbn. G. d., V-VIII, local and nowhere common. Eggs are found VII, 22-VIII, 11 and larvæ from VII, 15-X, 2 (Wrms). Food plants are lilac and ash.
- S. eremitus** Hbn. G. d., and occasionally not rare; the larva in August on pepper, mountain mint (Br), wild bergamot and Salvia.
- S. plebeius** Fab. Essex Co. VI (div); Hoboken VIII (Kr); Elizabeth VII (Bz); Staten Island V-VII; and probably g. d. The larvæ feed on the trumpet vine (*Tecoma radicans*), "Bignonia" and "Passiflora."

DOLBA Wlk.

- D. hylæus** Dru. Throughout the State, but local. Essex Co. VI-VIII (div); Woodbridge VI (Wrms); Paterson (Gr); Lakehurst VI, 16 (Ds). Eggs VI, VII, larvæ up to VIII, 17 (div). Feeds on black alder, sweet fern and "Prinos"; larva feeds very fast and reaches its full growth in 20 days (Br).

CHLÆNOGRAMMA Sm.

- C. jasminearum** Bdv. Hasbrouck Hts. (Wrms); Hewitt VII (Ds); Essex; Co. (div).

CERATOMIA Harr.

- C. amyntor** Hbn. Throughout the State VI and VII. Mr. Brehme reports eggs VI and VII and larvæ until October on elm, linden and birch. The caterpillars differ from all the other Sphinges by having four little thoracic horns.
- C. undulosa** Wlk. Generally distributed and not rare. Essex Co. V-VIII (div); Elizabeth VI-VIII (Bz); Staten Island V-VIII (Ds); Lake Hopatcong (Pm); Gloucester (Lt); 5-mile beach VI (Haim). Eggs VI and VII, larvæ until VIII (Br), on lilac, privet, ash and locust.
- C. catalpæ** Bdv. Throughout the State, wherever the Catalpa occurs. Since 1900 this species has invaded the State from the South, spreading first along the Delaware and gradually extending until it has reached all parts of the State. The larvæ are gaudy black and yellow and feed in colonies, sometimes sufficient to defoliate a large tree in a few days. In nurseries great injury has been done, and active measures are necessary to kill them off. There are two broods, and larvæ occur from July until September. Adults are found in May

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and June and again in July and August. Arsenites promptly applied are entirely effective.

LAPARA Wlk. (ELLEMA Clem.)

- L. bombycoides* Wlk. (*harrisii* Clem.) Rare, but g. d., the larva on pine. Lakehurst VII, 23 (Ds); Brown's Mills, Jn (Dke).
- L. coniferarum* Sm. & Abb. Equally rare, g. d., and also a pine feeder. Lakehurst VII, 17 (Bz).

Family SMERINTHIDÆ.

In this family the tongue is short or entirely absent, the head is small, the antennæ are more tufted and sometimes pectinated, the wings angulated, dentate or scalloped and the entire habitus more Bombycid.

MARUMBA Moore. (TRIPTOGON Brem.)

- M. modesta* Harr. Quite generally distributed, but rare; the larva on poplar and willow. Essex County VI (div); Hackensack (Gr), larvæ VIII, 22, IX, 3, Staten Island VII (Ds). The moth sometimes comes to light, as do others of this family.

SMERINTHUS Latr.

- S. jamaicensis* Dru. Elizabeth (Bz).
var. *geminatus* Say. Essex Co. V-VIII (div); Hopatcong (Pm); Staten Island VI-VIII (Ds), and g. d. throughout the State. Mr. Brehme finds eggs V and VI and larvæ until VIII on willow and poplar; other food plants are elm, apple, cherry, plum and ash.

PAONIAS Hbn.

- P. excæcatus* Sm. & Abb. Throughout the State, quite commonly, June to September; larvæ, which grow very slowly, until October. Food plants include the "Rosaceæ" and a large number of shade and forest trees.
- P. myops* Sm. & Abb. Hopatcong (Pm); Essex Co. VII (div); Staten Island VI. Apparently local, but probably found throughout the State. Larvæ on wild and cultivated cherry until November (Br).
- P. astylus* Dru. Hopatcong (Pm); Essex Co. V, VI, VII (div); Ft. Lee (Dyar); Newfoundland VII, Jamesburg VII, 1 (Jl), probably throughout the State where the food plant occurs. Eggs VI-VIII on huckleberry and dangleberry (Br); larvæ until frost.

CRESSONIA Grt. & Rob.

- C. juglandis* Sm. & Abb. G. d. and sometimes rather abundant. Essex Co. V, VI (div); Staten Island VI (Ds); Ft. Lee, Hopatcong (Bt). Eggs V-VIII, larvæ until X (Br) on hickory and walnut. Other food plants are ironwood and wild cherry. The larva is known as the "squeaking Sphinx" (Dyar).

Super-family SATURNOIDEA.

These are all large moths, and among them are our American silk spinners. They are heavy-bodied, clumsy species as a rule, with small retracted heads, mouth parts so aborted as to be unfit for feeding and body densely clothed with scales and hair.

There are three families: The "Saturniidae" are the largest of the species, expanding up to six inches or more, the wings are large and broad, with usually a transparent discal spot, and the antennæ are pectinated to the tip, with two long branches on each side of each joint. The caterpillars are all silk spinners and form a large, dense cocoon, in which the pupal stage is passed.

The "Ceratocampidæ" are quite different in appearance. They have narrower wings, pointed at the apex, there are no hyaline spots, and the antennæ have the pectinations shorter, confined to the basal half; but still two branches on each side of each joint. The caterpillars are furnished with horns or other processes, and some of them are very large and formidable in appearance. None of them are silk spinners, and the pupæ are formed under ground.

The "Hemileucidæ" are represented by a single species only, black with a partly transparent central band on the wings, the antennæ pectinated, with very short joints and single branches on each side of each joint. The caterpillars are set with bristly spines and form a cocoon.

Several of the larvæ of this series feed on cultivated plants and orchard trees, but none are really injurious. Their large size makes them easily visible, and hand-picking is usually the best method of getting rid of them. The species of "Anisota" sometimes become temporarily abundant in oak woods and may strip considerable areas, but they do no permanent harm.

Family SATURNIIDÆ.

There has been some shifting of generic names in this family, but the species are unchanged, and the changes are so obvious that the synonyms are not given.

PHILOSAMIA Grt.

P. cynthia Dru. Common near Jersey City and for some distance in its vicinity. Also taken at Paterson, at Trenton and near Philadelphia, but has not reached New Brunswick nor any of the cities or towns remote from the larger centres of population. Mr. Davis records it from Staten Island, and it is quite possible that it has a foothold at other points near the coast. It is an importation from China, and has never really established itself in the country at large. The caterpillar feeds chiefly upon the "Ailanthus," or "tree of heaven," sometimes known as "tallow-tree" from its odor when in bloom, and there are two annual broods, the winter being passed in the pupal stage.

SAMIA Hbn.

- S. cecropia* Linn. Occurs throughout the State June to August, and is by no means rare, although the adult is not often seen. The larvæ feed on most orchard and shade trees, and also on grape and other small fruits, sometimes devouring considerable foliage, and yet never abundant enough to do any material injury. The cocoons pass the winter attached to twigs or some other support, and there is only one brood.

CALLOSAMIA Pack.

- C. promethea* Dru. Common throughout the State June to August, and has two broods. The larva feeds chiefly on sassafras, but also on a large variety of other shrubs as well as fruit and shade trees. The cocoon is fastened to the twigs and remains suspended during the winter.
- C. angulifera* Wlk. Also quite generally distributed and two-brooded; but decidedly rare. Has been recorded from May to August, the larva feeding on tulip (*Liriodendron*), sassafras and wild cherry. The cocoons are not attached to the twigs and are found on the ground beneath the trees upon which the caterpillars have fed.

ACTIAS Leach.

- A. luna* Linn. Throughout the State, and locally not rare. It occurs from June to September, is two-brooded, and the caterpillars feed on walnut, sweet gum, birch and other forest trees. The cocoons are not fastened to the trees and winter on the ground.

TELEA Hbn.

- T. polyphemus* Cram. Throughout the State, June to August, the larva on most forest and shade trees. This is known as "the American silkworm," and while by no means rare, is never plentiful enough to do conspicuous injury. The cocoons drop to the ground and spend the winter on the surface; there is also a midsummer brood.

HYPERCHIRIA Hbn.

- H. io* Fab. Common throughout the State, June to August, the larvæ on a large list of food plants. The caterpillar is a very spiny affair, and if carelessly handled produces nettling. There is only one brood.

Family CERATOCAMPIDÆ.

EACLES Hbn.

- E. imperialis* Dru. Throughout the State VI-VIII, sometimes not uncommonly. The variety "didyma" DeB., less frequently, and specifically reported from Mt. Holly and 5-mile beach. The caterpillars

feed on a large variety of forest trees, including many conifers, and are sometimes found as late as mid-September.

CITHERONIA Hbn.

- C. regalis** Fab. Generally distributed, usually rare, June to August. The formidable looking larva, which has been called the "hickory horned devil," feeds on hickory, walnut, butternut, ash, persimmon, sweet gum and other trees; examples occurring until late September.

ADELOCEPHALA H. S.

- A. bicolor** Harr. Lake Hopatcong (Pm); a single example on the beach near Sandy Hook, some years ago. The fact that it has not been taken since by the many collectors who have scoured the State raises a doubt as to the correctness of the identifications. The larva is reported as feeding on "Gleditschia."

ANISOTA Hbn.

- A. stigma** Fab. Reported from all sections of the State in July and August and sometimes rather common. The caterpillar feeds on oak, hazel and chestnut, and is found until mid-September.
- A. senatoria** Sm. & Abb. Occurs from June to August throughout the State. The larva is the common "oak-worm," which is sometimes locally abundant and destructive. I have seen acres of oak scrub almost defoliated in South Jersey, and occasionally larger trees are badly eaten; but no permanent injury is caused, and the natural enemies of the species speedily regain control.
- A. virginiensis** Dru. Also quite generally distributed but much less common than the preceding. Flies in June and July, and the larva is also an oak feeder.

DRYOCAMPA Harr.

- D. rubicunda** Fab. Occurs throughout the State, but is somewhat local and rarely abundant, from May to July. The caterpillars are sometimes quite numerous on soft maple, and more rarely feed on oak.

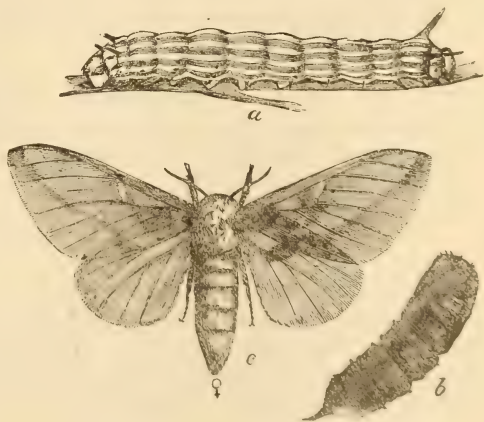


Fig. 178.—*Dryocampa rubicunda* a, larva; b, pupa; c, female adult.

Family HEMILEUCIDÆ.

HEMILEUCA Wik.

- H. maia** Dru. Greenwood Lake (Bt); Normannock, Lakehurst X, 18, flying in numbers (Ds); Gloucester (Lt); Culver's Pond, Asbury Park (Coll). The larvæ feed on oak in July and August; moths occur in September and October.

Super-family BOMBYCOIDEA.

Family SYNTOMIDÆ.

A small series of rather slightly built moths, small or of moderate size, black and yellow in color, with functional mouth parts, pectinated antennæ in the male, and rather long, slender abdomen. The structural characters for the family are chiefly found in the venation of the hind wings, and none of the members are at all injurious.

LYCOMORPHA Harr.

- L. pholus** Dru. Hopatcong (Pm); Normannock VIII, 27, Staten Island in midsummer (Ds); Plainfield VI, 27 (Gr); locally not rare on golden rod in August, in the northern part of the State. Larvæ on lichens (Bt), growing on stone fences (Dyar).

SCEPSIS Wik.

- S. fulvicollis** Hbn. Paterson VI, 26, VIII, 4 (Gr); Orange Mts. and Newark Dist. VII-IX (div); Staten Island VI-IX (Ds); Camden Co. IX (Lt); 5-mile beach (Haim); quite generally distributed and locally not rare; the larva on grass.

CTENUCHA Kirby.

- C. virginica** Charp. Found on Spiræa and other flowers, July to September; more common in the northern part of the State.

Family LITHOSIIDÆ.

These are small, slender moths with narrow fore and broad hind wings, the antennæ and palpi slender, the mouth parts well developed and functional. They differ from the "Arctiidæ, which they otherwise resemble in structure, by the lack of ocelli or simple eyes. The larvæ are covered with tufts of short, stiff hair, feed mostly on lichens and are not injurious.

GRAMBIDIA Pack.

- C. pallida** Pack. Rare near New York, VIII (Bt); Newark (Wdt); 5-mile beach VIII, 20-IX, 3 (div); attracted to light.

- C. cephalica** G. & R. Bamber IX, 1, Lucaston IX, 8, Brown's Mills VI, 24, VIII, 4, IX, 8 (Dke).

HYPOPREPPIA Hbn.

- H. miniata** Kirby. Andover VIII (Kr); Hopatcong (Pm); Newark (Wdt); 5-mile beach V, 28, VIII-IX, 11 (div).
H. fucosa Hbn. Occurs throughout the State in July and August, and specifically reported from Sparta (Ds), Paterson (Gr), Lakehurst (Ds), and 5-mile beach (div). I have beaten it from pines, have stirred it up in mossy meadows, and have taken it at light. Larva on mosses and lichens on trees (Bt) and has been beaten from red cedar at Paterson VI, 28 (Gr).

ILLICE Wlk. (CISTHENE Wlk.)

- I. subjecta** Wlk. Anglesea VII, 15-VIII, 21 (div); the larvæ on lichens (Bt).

CLEMENSIA Pack.

- C. albata** Pack. Newark, rare; flies in June.

Family NOLIDÆ.

Small, rather slight, broad-winged moths, in general resembling the "Lithosians," but usually with ashen gray colors and streaky, dentate black markings. The larvæ also resemble those of the other family, but have the anterior pair of abdominal feet aborted.

CELAMA Wlk.

- C. pustulata** Wlk. (Argyrophyes) Basking Ridge VI, 8 (Bwl); Elizabeth VII, 26 (Bz); New Brunswick, rare at light, in June.
C. cilicoides Grt. (Argyrophyes) "Atlantic States" (Dyar), and I have seen New Jersey specimens.
C. triquetra Fitch. (trinotata Wlk.) Greenwood Lake V (Bt); Boonton VIII (Wdt); Newark and Orange Mt. Dist. IV, V, VII, VIII (div), larva on hemlock and witch hazel; Staten Island V, VIII (Ds); New Brunswick (Coll); Westville (Lt).

NOLA Leach.

- N. clethræ** Dyar. Larva feeds on "Clethra alnifolia" and the species is quite certain to be found with us.
N. ovilla Grt. Preakness Mt. V, 5 (Bwl); Ft. Lee, V, VI, the larva on oak (Bt); Orange Mts. and Newark Dist. V, VI (div); Jersey City Hts. V, 8 (Sb); New Brunswick IV, Jamesburg IV (Coll), VII, 4 (Haim); Lakehurst V, 28 (Gr); Clementon V, 7 (Haim); Brown's Mills V, 13, 29 (Dke).

RŒSELIA Hbn.

- R. minuscula* Zell. Plainfield VI, 29 (Gr).
 var. *phylla* Dyar. Gloucester Co. V, 29 (Haim).

NIGETIA Wlk. (NOLA.)

- N. formosalis* Wlk. (*melanopa* Zell.) Newark, New Brunswick.

Family NYCTEOLIDÆ.

Obscurely marked, gray species; in appearance and wing form much like some of the Tortricids or "bell-moths," but with the structural characters mainly those of the Lithosians.

SARROTHRIPA Curt.

- S. revayana* Scop., var. *lintneriana* Spey. Guttenberg VII, 3 (Wrms); Newark VII (Soc); Elizabeth VII, 30 (Bz); the larva on willow and poplar. The species is not at all rare, and probably occurs throughout the State.

Family ARCTIIDÆ.

The adults are known as "tiger moths" from their bright stripings, the larvæ as "woolly bears" from the shaggy clothing of hair with which many of them are covered. The moths are stoutly built, of moderate or small size, with a broad head on which ocelli or simple eyes are always present, rather small palpi and a functional tongue. The antennæ vary, but are often pectinated in the male, and most of the species are rather closely scaled.

The larvæ are general feeders in most cases, but as a whole prefer low plants, plantain being an all but universal food. A few species are troublesome in the garden, but may be controlled by hand picking or a resort to arsenate of lead. Others, like the "fall web-worm," feed on trees and may become serious pests. Most of them spin a little silk and make a cocoon in which to pass the pupal stage. As the silk is too scant to do this properly, they add to it the hair with which they are covered. This hair, to facilitate such a felting process, is furnished with little spurs and branches which break off readily. The caterpillars should be carefully handled therefore, because these little barbs forced into a sensitive skin may set up an intense irritation resulting in blotches or swellings like a nettle rash.

EUBAPHE Hbn.

- E. læta* Guer. Forked River Mt. VII, 8 (Dke); in dry woods in June (Bt).

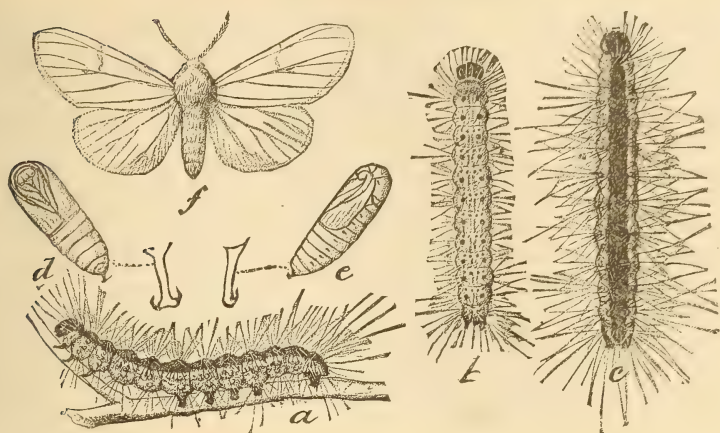


Fig. 179.

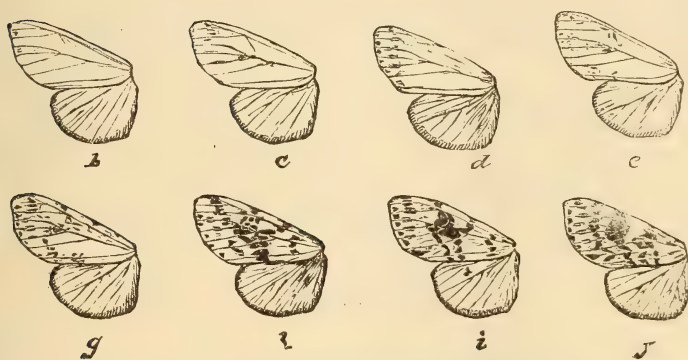


Fig. 180.

Fig. 179.—The fall web worm, *Hyphantria cunea*: a, b, c, varieties of larva; d, e, pupæ; f, moth of the normal white form.

Fig. 180.—Varieties in wing markings of *Hyphantria cunea*.

Fig. 181.—Female *Hyphantria* ovipositing on under side of leaf; b, a little group of eggs, enlarged.



Fig. 181.

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- E. *opella* Grt. Greenwood Lake, larvæ hiding by day in the dead leaves of oak woods (Dyar); Lake Hopatcong (Pm); Ft. Lee VI, 20 (Dke); Jamesburg VII, 4 (Lt); Lakehurst VII (Ds). The form "nigricans" Reak., is reported from Plainfield in early July (Bz).
- E. *immaculata* Reak. Paterson VI, 1-11 (Gr); throughout the northern part of the State; in dry places in overgrown fields (Bt).
- E. *aurantiaca* Hbn. Throughout the State VI-IX, in dry, overgrown fields. The larvæ are general feeders; Mr. Grossbeck has found them under stones in April, at Paterson, fed them on plantain, had pupæ V, 20 and adults VI, 1-6. Four varieties, "rubicundaria" Hbn., "ferruginosa" Wlk., "brevicornis" Wlk., and "quinaria" Grt., are based on the amount of black margin of secondaries, or the number of white spots on the primaries. They seem to be more or less local, and only one form may occur in one place, but on the other hand two or three of them may be found at the same place on the same day.

UTETHEISA Hbn.

- U. *bella* Linn. Common, late August to early October in low meadows along the coast, and locally inland, throughout the State. The larva feeds on cherry, elm, "Myrica," "Crotalaria," "Lespedeza," &c.
- var. *hybrida* Butler. Has the bands of primaries incomplete, the secondaries red. Paterson VIII, 7 (Gr) and generally, with the type.
- var. *terminalis* N. & D. Secondaries white. Occurs occasionally.
- var. *nova* N. & D. The pink is replaced by bright yellow. Little Falls VIII, 7, 3 specimens (Gr).
- U. *ornatrix* Linn. Taken at Philadelphia and probably occurs in New Jersey.

HAPLOA Hbn.

- H. *clymene* Brown. Lake Hopatcong VIII, 15 (Gr); Andover VIII (Kr); Ft. Lee (Bt); Staten Island VII, VIII (Ds); Newark (Soc); 5-mile beach VII, 14-22 (Haim).
- H. *lecontei* Guer. Occurs locally throughout the State in one or the other of its forms. "Lecontei" Guer. is the completely marked form, and that is rare, as is also the immaculate form "vestalis" Pack. "Confinis" Wlk., in which only the oblique band is complete, and "militaris" Harr., in which even that is broken, are the more abundant types.

The larvæ of all the species are more or less general feeders and hibernate in the partly grown condition.

- H. *confusa* Lyman. Fort Lee VII (Erb).
- H. *triangularis* Sm. Local, near Newark (Ang), VI, 12-30 (Bz); Hasbrouck Heights (Wrms).
- H. *contigua* Wlk. Sparta VII (Ds); Plainfield VII, 1-15 (Bz); Newark.

ECPANTHERIA Hbn.

- E. deflorata** Fab. Paterson (Gr); Ft. Lee VI (div); Newark (Soc); Staten Island (Ds); Woodbury VI, 18 (Kp). Quite generally distributed; but not common; the larva on willow, locust, and also plantago and other low plants. This is the "ocularia-scribonia" of the previous edition.

ESTIGMENE Hbn.

- E. acræa** Dru. Common throughout the State, but especially so along the coast, May to September. The larva is a general feeder, and from its occasional presence in enormous numbers on salt marshes is known as the salt marsh caterpillar.
- E. antigone** Strck. Lake Hopatcong (Pm); Ft. Lee (Bt); Newark VI, 24 (Sb); Elizabeth, VII (Bz); Staten Island (Ds). The larva is a general feeder (Dyar), and often bores into the stems of large mushrooms.

HYPHANTRIA Harr.

- H. cunea** Dru. Common throughout the State. The larva is the "fall web-worm," which in the late summer makes conspicuous nests or webs on a large variety of shade and orchard trees. There are two broods, the first in June and little noticed, the second in September. Spraying the foliage around the nests with arsenites as soon as they are noticed will serve to clean them out.

DIACRISIA Hbn. (SPILOSOMA Steph.)

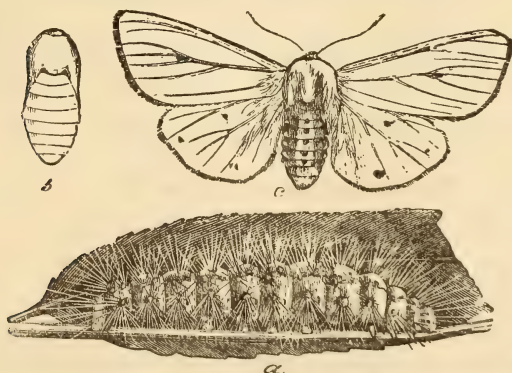


Fig. 182.—*Spilosoma virginica*: a larva; b, pupa; c, adult.

- D. virginica** Fab. Common throughout the State. The larva is the common white, yellow or reddish woolly caterpillar so often seen in gardens and feeding on all kinds of vegetables. There are two broods, and adults occur from May throughout the summer.
- D. latipennis** Stretch. Not rare locally (Wdt); Elizabeth V, 20–VI, 20 (Bz); Staten Island V, VI (Ds). In swampy meadows; the larva on Jack-in-the-pulpit, touch-me-not, plantago, other low plants and wild cherry (Bt).

ISIA Wlk. (PYRRHARCTIA Pack.)

- I. isabella* S. & A. Common throughout the State, April to August. The woolly larva is often seen late in fall crawling about, seeking shelter for hibernation, and is readily known by the black extremities and brown middle. There are two broods, and almost anything serves as food plant.

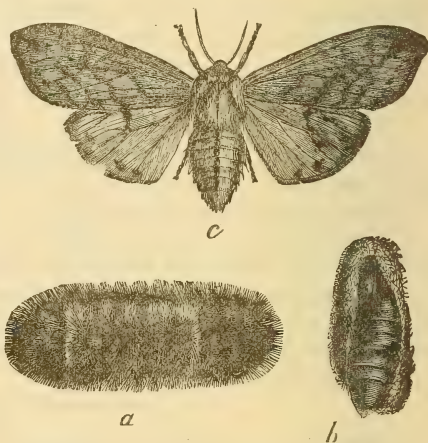


Fig. 183.—*Isia isabella*: a, larva; b, pupa in cocoon; c, female moth.

PHRAGMATOBIA Steph.

- P. fuliginosa* Linn. Lake Hopatcong (Pm); Paterson VII, 10 (Gr); Chester VIII, 6 (Dn); Newark Dist. (div); Jersey City VI, at light (Kr); Anglesea (div). The larva feeds on golden rod, skunk cabbage, iron weed and other plants.

APANTESIS Wlk. (ARCTIA Schr.)

- A. virgo* Linn. Hopatcong (div); Chester (Dn); Newark Dist. (div); 5-mile beach VIII, 24 (Haim). Probably throughout the State, but rare; the larva on plantain, lettuce and other low plants.
- A. virguncula* Kirby. Hopatcong (Pm); Newark (Soc). Probably throughout north Jersey; but everywhere rare.
- A. michabo* Grt. New Brunswick, in July, at light.
- A. parthenice* Kirby. Hopatcong (Pm); Newark (Soc).
- A. oithona* Strck., var. *rectilinea* French. New Jersey, without definite locality (Wrms).
- A. anna* Grt. Greenwood Lake (Dyar); Woodbury VII, 18 (Kp).
- var. *persephone* Grt. Newark (Wdt); near New York City (Bt). Both species and variety is decidedly rare.
- A. arge* Dru. Throughout the State from Sussex to Cape May County in every month from April to August. Mr. Grossbeck reports eggs at Paterson V, 4, larva from V, 18–VI, 20. It feeds on grass, plantago, *Chenopodium* *Polygonum* and other low plants.
- A. phyllira* Dru. Plainfield V, 18 (Gr); Newark Dist. (div); Woodbury VI, 8 (Kp). Not at all common, and, with it, the variety "*figurata*" Dru. is also found. The larva is a general feeder.

- A. nais** Dru. Throughout the State, May to September. The larva is a general feeder on low plants, and has been taken in Paterson (Gr), May 10-19.
- A. vittata** Fabr. Elizabeth VIII, 24 (Bz); 5-mile beach VI, and throughout the State generally with the preceding.
- A. phalerata** Harr. Plainfield V, 19 (Gr); 5-mile beach VIII, 3 (Haim), and in general with the two preceding. The three species last cited commonly fly together and are almost equally abundant. With flown specimens there is sometimes a question of identity; with good bred material at hand the differences are obvious.

AMMALO Wlk.

- A. tenera** Hbn. (*Cycnia*) Paterson VI, 15, VIII, 25 (Gr), to 5-mile beach, VIII, 22 (Haim); and quite common throughout the State. The larva on dog-bane.
- A. eglenensis** Clem. (*Cycnia*) Paterson V, 27, larvæ VII, 31 and IX, 11 (Gr); Ft. Lee (Bt); Newark (Soc); Staten Island VI (Ds). Feeds on milkweed and is two-brooded.

EUCHÆTIAS Lyman.

- E. egle** Dru. (*Cycnia*) Common all over the State; two-brooded; the curiously tufted larva on milkweed; flies in June and again late July and August.
- E. oregonensis** Stretch. Still to be discovered in the State.

PYGARCTIA Grt.

- P. abdominalis** Grt. Lakehurst, V, 29, VI, 13 (Ds); 2 specimens only.

HALISIDOTA Hbn.

- H. tessellaris** S. & A. Common throughout the State. The larva is a general feeder, often a nuisance on shade trees in cities, sometimes troublesome in gardens and frequently found on fruit trees, on which it does no serious harm.
- H. maculata** Harr. This is said to be rare near New York City (Bt), but becomes more common northwardly. The larva feeds on willow, oak and poplar.
- H. caryæ** Harr. Throughout the State. The larva occurs with that of "tessellaris" and has much the same habits; it may be found as late as October.

Family AGARISTIDÆ.

Medium sized moths, with black, contrastingly white spotted or red-banded wings, the antennæ slender, of equal thickness throughout or somewhat enlarged toward the tip. The caterpillars are curiously banded with red, brown and gray and feed on grape.

ALYPIA Hbn.

- A. octomaculata** Fab. Common in cities and large towns in June and July. The larva feeds on grape and is sometimes destructive on garden vines, but rarely occurs in the open country, where it also feeds on Virginia creeper. It succumbs readily to any of the arsenites. There is considerable variation and some of the forms bear a deceptive resemblance to the western "langtonii."

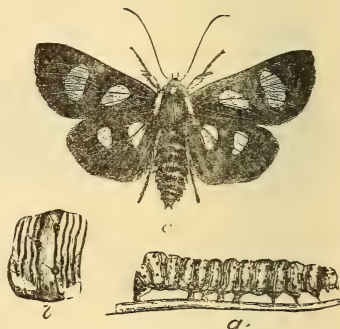


Fig. 184.—*Alypia octomaculata*; a, larva; b, an enlarged segment; c, adult.

PSYCHOMORPHA Harr.

- P. epimensis** Dru. Hopatcong (Bt); Paterson IV, 25 (Gr); Newark (Soc); Elizabeth, Plainfield, IV, larva on wild grape only (Bz); Staten Island IV (Ds). I have found the larva at Irvington, webbing up the leaves of grape in June, but never in numbers sufficient to be injurious. The adults always in June.

Family PANTHEIDÆ.

The members of this family resemble the owlet moths, but the thorax is shorter, more square, and the head is somewhat retracted. They have similar habits, however, and the larvæ are not unlike those of some of the "Acronycta" series. The chief characters used in their separation are found in details of the wing venation. None of the species are injurious, and none of them are commonly found even by collectors.

PANTHEA Hbn.

- P. furcilla** Pack. Larva IX, 1, at Little Falls (Gr); Lakehurst IX, 3, one specimen (Bz); Brown's Mills VI, 14 (Dke). Feeds on larch and pine.

DEMAS Steph.

- D. propinquilinea** Grt. Ramsey VI, 17 (Sleight). The larva on birch, walnut, maple, oak and beech.

- D. flavicornis* Sm. Plainfield V, 19 (Gr); Newark in May; Staten Island (Coll); taken rarely.

CHARADRA Wik.

- C. deridens* Gn. Plainfield V, 19 (Gr); Newark, V, at light (Wdt), VII, 16 (Bz); the larva makes a nest on leaves of oak (Dyar) and feeds also on birch and elm.

RAPHIA Hbn.

- R. abrupta* Grt. Has the same general distribution as "frater" and should be found in the State.
- R. frater* Grt. Paterson V, 20 (Gr); Ft. Lee (Bt); Jersey City VII, VIII (Sb); Newark, V, VI (Coll); Elizabeth V, VI, VIII (Bz); Staten Island VI (Ds); the curious larva on poplar and willow.

Family NOCTUIDÆ.

These are the "owlet moths," with plump, robust bodies, short, stiff, triangular primaries and broader secondaries. The antennæ are usually about half the length of the forewings or a little longer, simple, bristled, or in the males sometimes pectinated. They are rarely seen during the day and derive their common name from their night-flying habits, the eyes in some species glowing with a phosphorescent light. During the day they hide under bark or stones, in crevices of buildings, or wherever else they can find shelter. Some forms rest openly on tree trunks, stones, or lichen-covered logs, their colors and markings blending so perfectly with their surroundings that they are invisible except to the trained eye, but at night they fly readily and many of them are attracted to light. Others have a sweet tooth and frequent flowers, or are attracted to lures spread by the entomologist, such lures consisting of mixtures of molasses, beer and rum or their equivalents.

The caterpillars vary greatly, many of them being of the type known as "cut-worms" and decidedly injurious. These may be controlled by the bran and arsenic bait which is elsewhere described. The "cut-worms" are fond of bran, eating it in preference to their normal food, and succumb to the arsenic it contains. Its use depends on the nature of the crop to be protected; in corn and potato fields it is usually placed a spoonful to a hill in the late afternoon.

ACRONYCTA Ochs.

The moths of this genus are generally known as "Dagger moths" because on most of them there are short dagger-like marks, more like the greek "psi" on the fore wings. The food plants in this genus, when not specially credited, are given on the authority of Dr. H. G. Dyar.

- A. rubricoma* Gn. Paterson VI, 16, 26, larva IX, 1 (Gr); Newark (Wdt) and probably g. d. Caterpillar feeds on hackberry (*Celtis*).

- A. americana* Harr. Our largest species; occurs throughout the State and usually common. Paterson VII, 3 (Gr); Essex Co. V-VII (div); Staten Island VI, VII; Jersey City VII; New Brunswick (Coll). The larva occurs from VIII-X (Gr), and feeds on maple, elm, chestnut, linden, poplar, birch, alder, oak, hickory, ash, sycamore—and probably others.
- A. hastulifera* Sm. & Abb. Hopatecong (Pm); Newark (Soc); Palisade Park (Wr); Paterson VII, 17, larva IX, 19 (Gr); Staten Island VI, VII, larva on alder (Ds), and probably occurs elsewhere in the State; larva on alder (div) and maple (Bt).
- A. dactylina* Grt. Chester VII, 30 (Dn); Newark V, VI (div); Elizabeth, V, VI (Bz); Gloucester VI, 2 (Lt); Staten Island V, VII (Ds). The larva on alder, birch and willow.
- A. leporina* Linn. No State records as yet; but I still believe it occurs in New Jersey; the larva on poplar, willow and birch.
- A. populi* Riley. Recorded from Long Island and sure to occur in New Jersey; flies in May and June; larva on poplar.
- A. lepusculina* Gn. Ranges from New Hampshire to Florida and sure to occur in New Jersey.
- A. innotata* Gn. Staten Island, V, VII (Ds); Newark district; Elizabeth VII (Bz); the larva on hickory.
- A. betulæ* Riley. Westfield (Keller); Passaic Co., VII, 20-VIII, 10 (Bz); and probably elsewhere in the State on birch.
- A. morula* Grt. & Rob. New Brunswick, VII; Staten Island, V, VII, VIII (Ds); the larva on elm, apple and linden.
- A. interrupta* Gn. (*occidentalis* Grt. & Rob.) Throughout the State common V-IX; Newark V-VIII (div); Chester VIII, 9 (Dn); Metuchen V, 11, Plainfield V, 18, Paterson VIII, 1-22 (Gr); 5-mile beach VIII, 2-20 (Haim); Staten Island VII-IX (Ds); the larva on elm, birch, apple, plum, cherry.
- A. lætifica* Sm. Plainfield V, 18 (Gr); Crange Mts. VII (Wdt); several specimens marked only "New Jersey" without date.
- A. elisabeta* Sm. Elizabeth V, VII, VIII (div); Chester VIII, 6 (Dn); New Brunswick VII, 3 (Gr); larva probably on maple.
- A. lobeliæ* Gn. Throughout the State IV-VIII. Paterson, Newark, Jersey City, Elizabeth, New Brunswick, Staten Island, 5-mile beach; the larva on oak.
- A. furcifera* Gn. Paterson VII, 27, New Brunswick V, 15 (Gr); Newark VII (Wdt); Elizabeth, V-VIII (Bz); 5-mile beach, V, 20 (Haim); the larva on wild, fire and choke-cherry.
- A. hasta* Gn. Paterson V, 30, VII, 26, Metuchen V, 11 (Gr); Westside, Greenville VIII, 5 (Wrms); Elizabeth V-VIII (div); Staten Island IV, V, VII, VIII (Ds); larva on cherry VI, 26, IX, 19 (Gr).
- A. spinigera* Gn. Elizabeth IV-VI (Bz); Staten Island (Ds), and undoubtedly elsewhere in the State.

- A. clarescens* Gn. (pruni Harr.) Throughout the State VI to IX; the larva on apple, Mountain ash, wild and cultivated cherry, plum.
- A. superans* Grt. Hopatcong (Pm); Essex Co. (div); Elizabeth IV, 10 (Bz), and probably g. d.; the larva on apple, plum, cherry, birch, mountain ash, etc.
- A. lithospila* Grt. Newark VI, VIII (Wdt); Elizabeth V-VIII (div); Staten Island (Ds); the larva on hickory, oak, chestnut.
- A. tritona* Hbn. Hopatcong (Pm); Staten Island VI, VII (Ds); Lakehurst VII, IX (div); Clementon V, 9 (Lt); larva on cranberry, deerberry and "Azalea."
- A. connecta* Grt. Paterson IX, 20 (Gr); Jersey City VII (Kr); Elizabeth VII, VIII (div); Staten Island VI-VIII (Ds); the larva on willow.
- A. funeralis* Grt. Elizabeth V, VI (Bz); Forest Hill VII (Bwl); "the ornate caterpillar of this species was found at New Brighton, S. I., VIII, 6" (Ds); larva on hickory, birch, elm, apple.
- A. fragilis* Gn. "New Jersey" without other information. The larva on birch, mountain ash and apple.
- A. cæsarea* Sm. Essex Co. Park V, 20 (Kf); Woodside VI, 6 (Bwl).
- A. vinnula* Grt. Newark VI, VII (div); Elizabeth V, VI, VII (Bz); New Brunswick VI, VII; Staten Island VI, VII (Ds); the larvæ on elm.
- A. grisea* Wlk. Newark (Soc); New Brunswick, rare; the larva on apple, birch, willow, elm and arrow-wood.
- A. hamamelis* Gn. (*afflicta* Grt.) Woodridge VII, 29 (Wrms); Newark IX, 9 (div); Elizabeth V-VIII (Bz); the larva on oak (Dyar) and Walnut (Bt).
- A. subochrea* Grt. Jersey City at sugar VI (Kr); Newark V, VII (div); Staten Island (Ds); the larva on witch hazel.
- A. ovata* Grt. Throughout the State from V-VIII; Orange Mts. VI (Wdt); Newark VI, VII (Bwl); Elizabeth VI, VII (Bz); 5-mile beach VIII, 4, 27 (Haim); Staten Island VII (Ds); the larva on oak, beech and chestnut.
- A. modica* Wlk. (*exilis* Grt.) Guttenberg VI, 30 (Wrms); Elizabeth VI (Bz); New Brunswick VI, VII (Sm); Staten Island VI (Ds); the larva on oak.
- A. hæsitata* Grt. Ramsey VI, 7 (Sleight); Boonton VII (Bwl); Elizabeth VI (Bz); 5-mile beach VIII, 4, 27 (Haim); probably throughout the State and mixed with "ovata" and "inclara"; flies from VI-VIII.
- A. inclara* Smith. (*hamamelis*) Common throughout the State VI-IX and quite variable. Larva feeds on oak, chestnut, birch.
- A. increta* Morr. Plainfield VII, 5, Newark IV, 25 (Bz); Jamesburg VI, Staten Island V, VI (Ds).
- A. retardata* Wlk. G. d., and not rare. Essex Co. VIII (div); Paterson VI, 26, VIII, 30 (Gr); Elizabeth, V, VI (Bz); New Brunswick VI, VII (Coll); Staten Island V-VIII (Ds); Woodbury VI, 8 (Kp); the larva on maple.

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- A. impleta* Wlk. (*luteicoma* G. & R.) Jersey City VI (Kr); Newark V (Wdt); Elizabeth IV, 20-V, 30 (Bz); New Brunswick IX, 9, larva on sassafras (Gr); Staten Island V, VI (Ds); 5-mile beach VIII, 2 (Haim). The larva is a general feeder on orchard and forest trees.
- A. sperata* Grt. Newark Dist. (div), and probably throughout the State V-VIII. The larva feeds on poplar and alder.
- A. noctivaga* Grt. Essex Co. V (div); Staten Island V (Ds), and probably g. d., though rare; larva on poplar and a variety of low plants.
- A. impressa* Wlk. Throughout the State, not rare. Chester (Dn); Hopatcong (Pm); Jersey City VI (Kr); Elizabeth IV, VII (Bz); Staten Island (Ds). The larva feeds on a wide range of orchard and forest trees and some small fruits, but is not injurious.
- A. distans* Grt. Elizabeth VIII, 15 (Bz); Lakehurst IV (Ds). Usually confounded with "*impressa*" and probably occurs with that species. The larva feeds on poplar, willow, birch and alder.
- A. xyliniformis* Gn. Throughout the State, not rare. Essex Co. VI, VII (div); Elizabeth IV, VII, VIII (Bz); Chester VII, 8 (Dn); Elizabeth IV, VI, VIII (Coll); 5-mile beach VII, 25, VIII, 2 (Haim); the larva on birch and blackberry.
- A. oblinita* Sm. & Abb. Common throughout the State V-VIII. The larva is a general feeder on orchard and small fruits and also on a variety of forest trees and other plants, but has never yet been injurious in this State.

ARSILONCHE Led.

- A. albovenosa* Goeze. Throughout the State, IV-IX, more common along the coast. Larva on cat-tail VI, 26 at Paterson (Gr), and from late September to the middle of October they were on parts of the Hackensack meadows in countless numbers. Feeds generally on grasses and on smart-weed and willow.

HARRISIMEMNA Grt.

- H. trisignata* Wlk. Hopatcong (Pm); Chester (Dn); Essex Co (div); Elizabeth VII (Bz); Staten Island VI, VIII (Ds); and rarely found throughout the State. It is a bizarre species in all stages; the larva on lilac, winterberry and huckleberry (Dyar), also on "*Cephalanthus occidentalis*" (Bz).

CERMA Hbn.

- C. cora* Hbn. Atco, rare (Lt).

POLYGRAMMATA Hbn.

- P. hebraicum* Hbn. Del. Water Gap VII, 12 (Coll); Ramsey VI, 17 (Sleight); Newark (Ang); Woodbury VI, 18, VII, 20 (Kp); 5-mile beach (Haim).

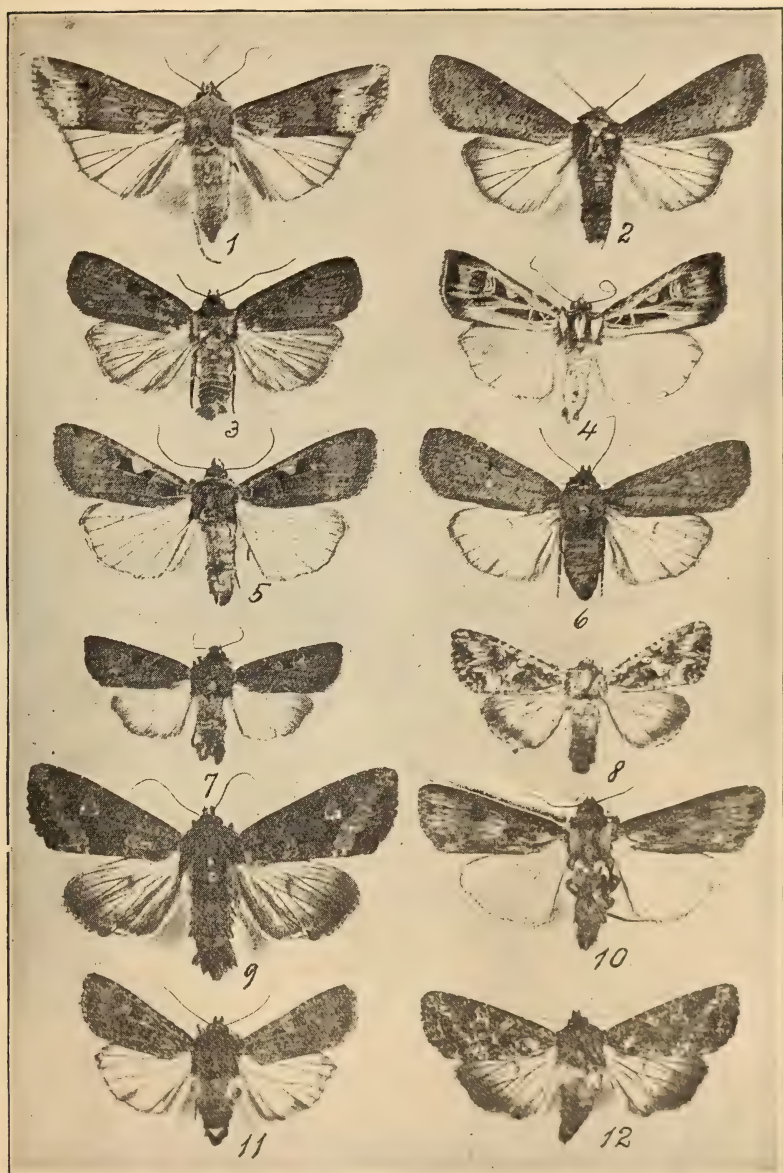


Fig. 185.—Common owlet moths of New Jersey: 1, *Agrotis ypsilon*; 2, *Peridroma saucia*; 3, *Noctua bicarnea*; 4, *Feltia subgothica*; 5, *Noctua c-nigrum*; 6, *Noctua clandestina*; 7, *Euxoa tessellata*; 8, *Mamestra trifolii*; 9, *Xylophasia arctica*; 10, *Feltia malefida*; 11, *Euxoa messoria*; 12, *Xylophasia devastatrix*.

MICROCOELIA Gn.

- M. diphtheroides** Gn. Hopatcong (Pm); Essex Co. VI, VII (div); Elizabeth V, 20-VII, 30 (Bz); Staten Island V-VIII (Ds); New Brunswick (Coll); 5-mile beach (Haim); and probably throughout the State. The form "obliterata" Grt. occurs with the type and is the more common.

BRYOPHILA Tr.

- B. lepidula** Grt. Generally distributed, but rare.
- B. teratophora** H. S. Newark Dist.; New Brunswick. Not really a rare species, but has not been reported by collectors, and my specimens have no dates.

CHYTONYX Grt.

- A. palliatricula** Grt. Staten Island VII (Ds); Anglesea VII (Sm), and throughout the State in July, rarely. The form with the white dot in median space is the more common.

MOMA Hbn.

- M. fallax** H. S. Paterson IV, 30 (Gr) V, 10 (Bz); Chester VIII, 19 (Dn); Essex Co. V (div); Staten Island V (Ds); Westville, VIII, 19 (Jn); Lakehurst, VIII, 23 (Gr). The curiously banded larva feeds on "Viburnum" (Dyar) and on poplar.

BAILEYA Grt. (LEPTINA Gn.)

- B. dormitans** Gn. Newark (Wdt), and probably rare throughout the State.
- B. doubledayi** Gn. Suffern, N. Y., VII (Bz), and undoubtedly occurs this side of the State line as well.
- B. ophthalmica** Gn. Newark (Soc); Staten Island V, VI (Ds); New Brunswick (Coll).

CATABENA Wlk.

- C. lineolata** Wlk. Chester (Dn); Elizabeth VII, VIII (Bz), feeds on Verbena (Bt).

CRAMBODES Gn.

- C. talidiformis** Gn. Hopatcong (Pm); Ft. Lee (div); Jersey City IX (Sb); Newark VII (Wdt); Elizabeth VII (Bz); Staten Island VIII (Ds); and probably throughout the State; the larva on Verbena.

PLATYSENTA Grt.

- P. videns** Gn. Jersey City to Cape May VI-IX, in swampy and marsh lands along shore and inland, sometimes not uncommon.

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SENTA Steph.

S. defecta Grt. "New Jersey," without definite locality.

BALSA Wlk.

B. malana Fitch. Throughout the State V-VIII and recorded by most collectors. Feeds on apple; "a little green larva dotted with yellow" (Dyar).

B. tristrigella Wlk. Newark V (Wdt); Woodside VI, 20 (Bwl); Hemlock Falls (Sb); Elizabeth VI (Bz), and undoubtedly throughout the State.

B. labecula Grt. Occurs near New York City, and sure to be found in New Jersey.

"Triquetrana" Fitch referred to this genus in the last edition will be found in the "Nolidæ."

ANORTHODES Sm.

A. tarda Gn. (prima Sm.) Newark VIII (Wdt); 5-mile beach VIII, 20 (Haim).

CARADRINA Ochs.

C. multifera Wlk. Ramsey IX, 30 (Sleight); Woodbridge VIII, 12 (Wrms); "New Jersey" (Coll).

C. derosa Morr. Described from "New Jersey" and never since found in or out of the State; probably an exotic.

C. miranda Grt. Recorded from Newark to 5-mile beach, VI-IX, and surely occurs throughout the State.

PERIGEA Gn.

P. xanthioides Gn. Throughout the State from June to October.

P. vecors Gn. Recorded from Jersey City to Anglesea, May to September, and occurs throughout the State, not rarely.

P. epopea Cram. Hopatcong (Pm); Jersey City at sugar VII (Kr); Elizabeth VIII, 9 (Kp); Staten Island VI, IX, X (Ds); 5-mile beach VIII, 2-27, common (Haim).

OLIGIA Hbn.

O. festivoides Gn. Throughout the State, IV-VIII; comes readily to light and is recorded by all collectors.

O. chalcedonia Hbn. Occurs with the preceding; but less abundantly.

O. versicolor Grt. 5-mile beach VIII, 20 (Haim).

O. grata Hbn. Sussex Co. to Anglesea V-X; recorded by all collectors.

HILLIA Grt.

H. crasis H. S. Hopatcong (Pm).

LUPERINA Bdv.

- L. passer* Gn. Throughout the State V-VIII; recorded by all collectors.
L. burgessi Morr. Elizabeth IX, 16 (Kp); Lakehurst IX (div); Cape May Co., 1 specimen at light (Lt).

XYLOPHASIA Steph.

- X. remissa* Hbn. Hopatcong VI, 21 (Sleight); Elizabeth VI, 16 (Bz); "New Jersey" (Coll).
X. suffusca Morr. Newark (Soc).
X. vultuosa Grt. Jersey City VI, VII (Kr).
X. apamiformis Gn. Newark VI, 4-15 (Sb); Elizabeth VIII (div); River-
 ton VII, 31 (Jn); Camden V, 28, Westville VI, 29 (Kp).
X. finitima Gn. Jersey City on raspberry bloom in May (Kr).
X. lateritia Hbn. "New Jersey" without definite locality.
X. cogitata Smith. Del. Water Gap VII, 12 (Coll).
X. dubitans Wlk. Throughout the State VII-IX; more or less common.
X. impulsa Gn. Ramsey VI, 19 (Sleight); Elizabeth VI, 21, 1 specimen
 (Bz); Staten Island VI (Ds).
X. devastatrix Brace. Throughout the State commonly, all season. The
 larva is one of the most destructive of our field cut-worms.
X. arctica Bdv. Common throughout the State VI-IX; the larva is de-
 structive to corn, cabbage and garden plants.
X. verbascoides Gn. Hopatcong (Pm); Elizabeth VIII, 6 (Kp); Staten
 Island IV, VI (Ds).
X. cariosa Gn. Ramsey VI, 7 (Sleight); Jersey City VI (Kr); Newark
 VI (Wdt); Elizabeth VI, VII (Bz); 5-mile beach VII, 4 (Weigand).
X. vulgaris G. & R. "New Jersey" (Coll).
X. lignicolor Gn. Ramsey VI, 25 (Sleight); Caldwell (Cr); Newark VIII
 (Wdt); Elizabeth VII (Bz); Staten Island VI, VII (Ds); New Bruns-
 wick VII, 3 (Gr).

HADENA Schrank.

- H. bridghami* G. & R. Ramsey VII, 25 (Sleight); Seabright, on sunflow-
 ers, Jersey City at sugar VII (Kr); the type locality is "New Jersey."
H. fractilinea Grt. Hopatcong (Pm); Staten Island VIII, 7 (Ds); New
 Brunswick (Coll); Lakehurst IX (Bz); probably throughout the
 State.
H. miseloides Gn. Paterson to 5-mile beach, VI-VIII; not rare through-
 out the State; larva solitary on "Smilax"—green briar (Dyar).
H. viridimusca Sm. "New Jersey" without specific locality or date.
H. mactata Gn. Englewood Cliffs X, 15, at sugar (Dke); Elizabeth IX,
 2 (Bz).
H. turbulenta Hbn. Throughout the State, local VI, VII, VIII; larva
 gregarious on "Smilax"—green briar—and horse nettle.

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- H. modica* Gn. Andover VIII (Kr); Snake Hill VII (Wdt); Woodside VIII, 18 (Bwl); Newark VII (div); Elizabeth VII (Bz); Staten Island VI-VIII (Ds); 5-mile beach VIII, 27 (Haim).
H. hausta Grt. Jersey City Hts. IV, 20, Newark (Sb), Elizabeth VI, 24, 1 specimen (Bz).
H. diversicolor Morr. Edgewater Hts. IX, 10 (Wrms).

MACRONOCTUA Grt.

- M. onusta* Grt. Ramsey IX, 22 (Sleight); Elizabeth IX, 18 (Bz); "New Jersey" (div); the larva bores in the roots of German lily (Dyar) and blue flag (Bird).

DRYOBOTA Led.

- D. illocata* Wlk. Hopatcong (Pm); 5-mile beach VIII, 22 (Haim), and probably throughout the State.

HYPPA Dup.

- H. xylinoidea* Gn. Throughout the State V-IX; not rare.

FERALIA Grt.

- F. jocosa* Gn. Paterson IV, 4-6 (Gr); Newark Dist. III, IV, the larva on hemlock (Soc); is a very local species, but not rare where it occurs.
F. major Sm. Occurs in New York just north of the line, and will undoubtedly be found also in New Jersey.

TRACHEA Hbn.

- T. delicata* Grt. Ft. Lee VIII, 18 (Wrms); Jersey City VIII (Kr); Elizabeth VIII (Bz).

EUPLEXIA Steph.

- E. lucipara* Linn. Throughout the State V-IX, not rare; larva on birch, "Viburnum," etc.

ACTINOTIA Hbn.

- A. ramosula* Gn. Great Notch VIII, 26 (Dke); Ft. Lee (Bt); Caldwell (Cr); Newark V (Bwl); Elizabeth IV, VII, IX (div); Staten Island V-VIII (Ds).

DIPTERYGIA Steph.

- D. scabriuscula* Linn. Throughout the State V-VIII; larva on "Rumex."

PYROPHILA Hbn.

- P. tragopogonis* Linn. Ramsey VIII, 5 (Sleight); "New Jersey" (Coll).
P. pyramidoides Gn. Throughout the State, V-IX, sometimes locally common. "One of the commonest larva of early spring" (Dyar), feeding on wild cherry, apple, poplar, chestnut, etc.

HELOTROPHA Led.

- H. reniformis** Grt. Throughout the State VI-IX, often common; the variety "atra" Grt. occurs with the type and is sometimes the more abundant.

PRODENIA Gn.

- P. commelina** S. & A. Throughout the State VIII to X; but the rarest of the species belonging to the genus. All the larvæ feed on grasses.
- P. ornithogalli** Gn. Throughout the State VIII-10; locally common.
- P. eudiopta** Gn. With the preceding and at the same dates.

LAPHYGMA Gn.

- L. frugiperda** S. & A. Common throughout the State VIII-X. The larva is the "fall army worm," which occasionally becomes abundant enough to cause serious injury to late crops; even fruit trees sometimes suffer. The varieties "fulvosa" Riley and "obscura" Riley occur with the type, but not so abundantly.

MAGUSA Wik.

- M. divaricata** Grt. Newark in August at light (div).

HOMOHADENA Grt.

- H. badistriga** Grt. Newark district; larva on honeysuckle.

ONCOCNEMIS Led.

- O. riparia** Morr. Occurs on Long Island and will yet be found along shore in New Jersey.
- O. saundersii** Grt. Ramsey IX, 15 (Sleight).

LEPIPOLYS Gn.

- L. perscripta** Gn. Ramsey IX, 23 (Sleight), and at other points in New Jersey.

ADITA Grt.

- A. chionanthi** S. & A. Newark (Soc); single specimens only.

COIPANOLIS Grt.

- C. cubilis** Grt. Lakehurst in April (Ds).

EUTOLYPE Grt.

- E. rolandi** Grt. Forest Hill IV, 22 (Wrms); Staten Island IV (Ds).
- E. bombyciformis** Sm. Larva on shell-bark hickory and is sure to occur in New Jersey.

PSAPHIDIA Wik.

- P. grotei* Morr. Staten Island IV, 15 (Ds); New Brunswick IV, 17 (Sm).
P. resumens Walk. Paterson IV, 24 (Gr); Newark (div), and probably elsewhere in the State.
P. thaxterianus Grt. Will yet be found in New Jersey.

RHYNCHAGROTIS Sm.

- R. rufipectus* Morr. Will occur in the northern part of the State.
R. brunneicollis Grt. Ramsey VI, 22 (Sleight); Newark VI, 9 (Wdt); Elizabeth VII (Bz); Staten Island VI, 21 (Ds); 5-mile beach VII, 1, VIII, 20 (Haim).
R. anchoceloides Gn. Staten Island IX, X (Ds); Newark VIII, 5 (Sb); Elizabeth, VII, VIII (Bz); Westville VII, 2 (Lt); Lakehurst IX, 27 (Gr); DaCosta VIII, 16 (Dke); 5-mile beach IX (div). The larva is one of the commoner cut worms and feeds on grape (Bt) as well as a variety of low plants.
R. brunneipennis Grt. Elizabeth VII, 20 (Coll).
R. placida Grt. Elizabeth VIII, 4 (Kp); Lakehurst IX, 5 (Bz).
R. alternata Grt. Sussex Co. VIII, 24, Jamesburg VII, 4 (Coll); Staten Island VIII, IX, X (Ds); Newark VII (div); Elizabeth VII (Bz); Camden (Kp).

ADELPHAGROTIS Sm.

- A. prasina* Fab. Hopatcong (Pm); Newark VII-IX (div); Staten Island VII, VIII (Ds); Elizabeth VII, 30 (Coll).

PLATAGROTIS Sm.

- P. pressa* Grt. Hopatcong (Pm).

EUERETAGROTIS Sm.

- E. sigmoides* Gn. Hopatcong V, 22 (div); Newark (Soc); Elizabeth VII, on sugar (Bz).
E. perattenta Gn. Newark (Wdt); Staten Island VI (Ds).
E. attenta Grt. Occurs rarely near New York (Bt).

SEMIOPHORA Steph.

- S. elimata* Gn. Staten Island IX (Ds); Lakehurst IX (Ds).
S. janualis Grt. Lakehurst IX (div). The Lakehurst localities for this and the preceding species may prove to refer to the following.
S. grisatra Sm. Lakehurst IX, 27, 1 ♀ type (Gr).
S. atoma Sm. Lakehurst IX, 27, 1♂, 9 ♀ type (Gr).
S. opacifrons Grt. Rare near New York (Bt).
S. tenebrifera Wik. (*catherina* Grt.) Taken at Philadelphia V, 1, and recorded from "New Jersey," without specific locality.

PACHNOBIA Gn.

- P. monochromatea* Morr. Near Newark, very rare (Soc); Brown's Mills Junction V, 20 (Dke), 1 specimen.
- P. manifesta* Morr. Paterson V, 20, (Gr); Staten Island V (Ds); Newark, in early spring (div); Mr. Seib has bred it from a larva with curious feeler-like processes found under leaves in a swamp.
- P. fishii* Grt. Newark IV (Bz); Silver Lake, Staten Island IV, 29 (Shoemaker).

AGROTIS Tr.

- A. badinodis* Grt. Caldwell (Cr); Newark (Soc); Elizabeth IX (Bz); Staten Island IX (Ds); Lakehurst IX, 27 (Gr).
- A. violaris* G. & R. Riverton IX, 20 (Jn); Manumuskin X, 10-21 (Dke).
- A. ypsilon* Rott. Common throughout the State, V-IX; the larva is one of the injurious cut-worms.
- A. geniculata* G. & R. Ramsey IX, 20 (Sleight); Sussex Co. VIII, 21 (Coll); Caldwell (Cr); Lakehurst IX (div); Lucaston IX, 8 (Dke); Cape May Co., 1 spec. (Lt).

NOCTUA Linn.

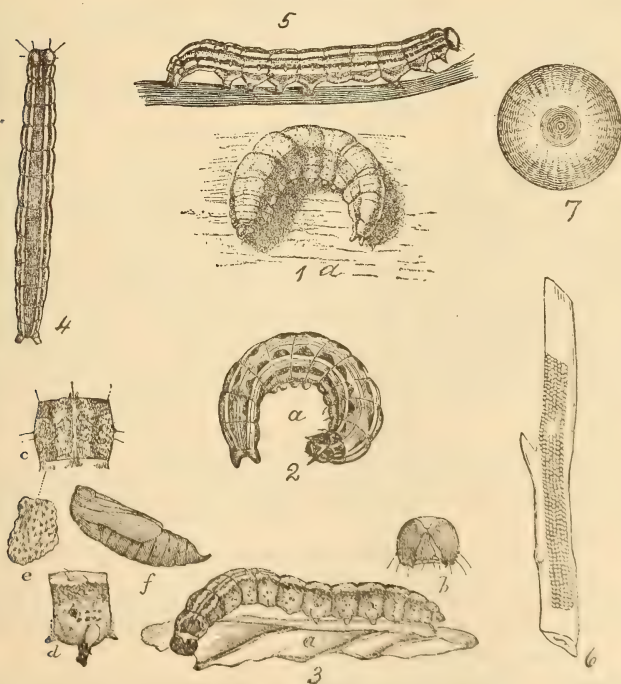


Fig. 186.—Cut-worms of typical forms; eggs natural size (6) and enlarged (7).

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- N. smithii* Snell. Throughout the State, VIII & IX, more common in the northern portion. This is the species usually named "baja" in collections.
- N. normaniana* Grt. Sussex Co. VIII, 22, New Brunswick VIII, IX (Coll); Staten Island VIII (Ds); Caldwell (Cr). Locally common, but seems confined to the northern part of the State.
- N. bicarnea* Gn. Throughout the State, VII-XI usually common. The larva is a general feeder on low plants; but is not one of the economically important species.
- N. c-nigrum* Linn. Common throughout the State, VII-XI. The larva is one of the injurious species found in fields in the spring.
- N. phyllophora* Grt. Hopatcong (Bt); Newark V-VIII (div); larva in March (Sb).
- N. plecta* Linn. Throughout the State V-IX, sometimes quite numerous. The larva feeds on celery, lettuce and similar plants; but rarely in injurious numbers.
- N. collaris* G. & R. Ramsey IX, 10 (Sleight).
- N. haruspica* Grt. Hopatcong (Pm), and undoubtedly elsewhere in North Jersey.
- N. clandestina* Harr. Common throughout the State V-IX, concealed under bark, in crevices and other shelter. The larva is one of the more injurious cut-worms.
- N. lubricans* Gn. Great Notch VIII, 26 (Dke); Boonton VIII, Elizabeth VIII, 13 (Kp); Newark VIII (div).

PERIDROMA Hbn.

- P. occulta* Linn. Newark, at light (Wdt); Staten Island VIII (Ds); 5-mile beach VIII, IX (div).
- P. margaritosa* Haw., var. *saucia* Hbn. Throughout the State VII-XI. The larva is a general feeder and one of the injurious cut-worms.
- P. incivis* Gn. Boonton IX (Bwl); Caldwell (Cr); Jersey City VII, at sugar (Kr); Newark (div); Elizabeth VIII, IX, 16 (div); Staten Island VIII-X (Ds); Stone Harbor VIII, 3 (Dke); 5-mile beach, VIII, 20 (Haim).

RHIZAGROTIS Sm.

- R. acclivis* Morr. Rare near New York (Bt). I have seen specimens from Maryland, and there is no reason why it should not occur in New Jersey.

FELTIA Wik.

- F. subgothica* Haw. Occurs throughout the State, and is the most common of the allied species. The caterpillar is sometimes quite abundant, but rarely injurious.
- F. jaculifera* Gn. With the preceding in a general way, but less abundant, and in some localities entirely absent.
- F. herilis* Grt. Also occurs throughout the State with the two preceding, but is more rare than either.

- F. gladiaria** Morr. Hopatcong (Pm); Newark IX, X (div); Staten Island IX (Ds); New Brunswick IX, 18 (Coll), and probably throughout the State.
- F. venerabilis** Wlk. Newark IX, 15 (Wdt); Elizabeth IX (Bz); Staten Island IX (Ds); Lakehurst IX, 27 (Gr).
- F. volubilis** Harv. Ft. Lee V, 30 (Wrms); Newark, at light X (Wdt), Chester (Coll), and elsewhere in North Jersey.
- F. annexa** Tr. Staten Island VIII, IX (Ds); Lakehurst IX, 27 (Gr); 5-mile beach VIII, IX (div); and probably throughout South Jersey; the larva is a general feeder and sometimes rather plentiful.
- F. malefida** Gn. Trenton (U S Ag); Anglesea IX (Coll), and probably throughout South Jersey.

POROSAGROTIS Sm.

- P. vetusta** Wlk. Paterson IX, 30 (Gr); Anglesea IX, 28; and throughout the State on goldenrod in September during the day.
- P. mimallonis** Grt. Common near New York (Bt).
- P. tripars** Wlk. Staten Island IX, 21 (Ds); Lucaston IX, 20 (Dke); Lahaway IX, seasonally not rare.

EUXOA Hbn. (CARNEADES Grt.)

- E. velleripennis** Grt. Ramsey IX, 23 (Sleight); Great Notch VIII, 26 (Dke); Guttenberg VIII, 29 (Wrms); Newark (Soc); Elizabeth IX, 7 (Coll); Atco VIII, 2 (Lt).
- E. fumalis** Grt. Rare near New York (Bt).
- E. detersa** Wlk. Throughout the State in late fall on goldenrod; flying freely in the bright sunshine; especially common near the shore.
- E. bostoniensis** Grt. Ramsey IX, 26 (Sleight); Paterson X, 8 (Gr); Newark IX, 2 (Coll); Staten Island IX, X (Ds); probably occurs throughout the more northern part of the State.
- E. messoria** Harr. Common throughout the State, June to September. The larva known as the "reaping rustic" is the most injurious and abundant of our early cut-worms and is especially troublesome in South Jersey on sweet-potatoes. The bran-arsenic remedy works perfectly for this species.
- E. tessellata** Harr. Also common throughout the State, and a close ally of the preceding in its destructive work.
- E. albipennis** Grt. Newark (Ang).
- E. obeliscoides** Gn. Chester VII, New Brunswick VII (Coll); probably occurs throughout the more northern sections of the State.
- E. redimicula** Morr. Staten Island VII (Ds).

ANYTUS Grt.

- A. privatus** Wlk. Ramsey IX, 26 (Sleight); Paterson IX, 10 (Gr); Elizabeth IX (Bz); and, not commonly, throughout the State VIII & IX.
- A. capax** Grt. Ramsey IX, 19 (Sleight).

UFEUS Grt.

U. plicatus Grt. Newark (Sb).

MAMESTRA Ochs.

- M. nimbosa* Gn. Caldwell (Cr); Newark (Soc).
M. imbrifera Gn. Caldwell (Cr); Newark (Soc).
M. purpurissata Grt. Chester VIII, 17, Sussex Co. VIII, 23 (Coll); not common near New York (Bt).
M. meditata Grt. Chester VIII to Anglesea VI, VIII, IX; and generally throughout the State, chiefly VIII & IX.
M. lustralis Grt. Sure to be found in New Jersey.
M. detracta Wlk. Newark VI (Sb); Elizabeth VI, VII (Bz); Staten Island VI, VII (Ds); Jamesburg VII, 4 (Dke).
M. distincta Hbn. Caldwell (Cr); Newark IV (div); Elizabeth IV (Bz); Staten Island IV, V (Ds); the larva on grape.
M. atlantica Grt. "New Jersey," without definite locality.
M. subjuncta G. & R. Throughout the northern half of the State; New Brunswick to Chester V-VIII. The larva is a general feeder on grasses, weeds, and sometimes becomes injurious on cabbage and other cultivated plants.
M. grandis Bdv. Newark VI, 20, VIII, 6 (div); Elizabeth VI (Bz); Staten Island VI, Jamesburg VII (Ds), and probably throughout the northern part of the State; larva on burdock and a variety of other low plants.
M. trifolii Rott. Throughout the State, V-X, common; larva on cabbage, clover, Chenopodium, &c., and sometimes injurious.
M. rosea Harv. Ramsey V, 23 (Sleight); Paterson VI, 15 (Gr.); Newark, at light VIII (Wdt); Elizabeth VI, 10 (Bz).
M. congermana Morr. Ramsey V, 29 (Sleight); Ft. Lee VII, 30 (Wrms); Newark, at light, rare (Wdt); Elizabeth VII (Bz); Staten Island V, VII (Ds).
M. rubefacta Morr. Lakehurst V, 29 (Ds).
M. picta Harr. Throughout the State VI, VIII, locality common; the gaudy yellow, black-striped and barred larvæ are sometimes found

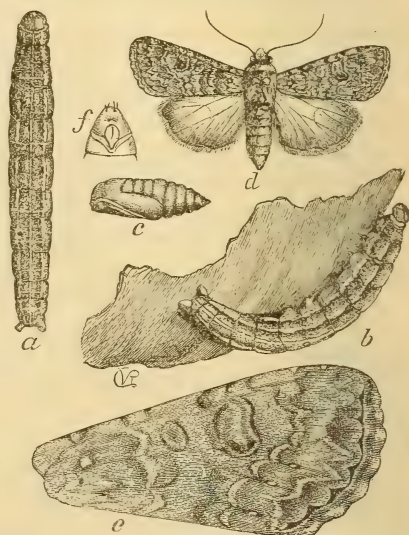


Fig. 187.—*Mamestra trifolii*: a, larva from above; b, same on cabbage leaf; c, pupa; d, adult; wing of moth enlarged.

abundant on cabbages, though feeding also on other low plants. Prompt application of the arsenites should be resorted to when the species is noticed.

- M. lubens* Grt. Hopatcong (Pm); Ramsey V, 28 (Sleight); Newark VI, larva on huckleberry, sumac and birch (Sb); Elizabeth VI, VII (Bz); Staten Island VII (Ds).
- M. latex* Gn. Ramsey V, 21 (Sleight); Orange Mts. VI (Wdt); Montclair VI, 5, Elizabeth V, 28 (Bz); Staten Island V-VI (Ds); National Park VI, 10 (Dke); a dirty brown larva on low plants (Dyar).
- M. adjuncta* Bdv. Recorded from all parts of the State in August; larva on asparagus, goldenrod and other plants.
- M. repentina* Morr. West Hoboken; the type and only example ever taken.
- M. legitima* Grt. Boonton VIII (Bwl); Hopatcong (Pm); Sussex Co. VII, New Brunswick VIII, 20 (Coll); Jersey City VII (Kr); Elizabeth VIII, 19 (Kp); Staten Island VII, VIII (Ds); Lucaston VII, 27 (Dke); the larva feeds on asparagus, beans, cabbage and a variety of other garden plants, has two annual broods, and is sometimes injurious.
- M. lilacina* Harv. Newark IX (div).
- M. goodelli* Grt. Newark (Sb); 5-mile beach VII, 26 (Haim).
- M. ectypa* Morr. Morris Plains (Neum).
- M. renigera* Steph. Common throughout the State and almost all season; larva a general feeder and sometimes injurious.
- M. olivacea* Morr. Throughout the State VI, VIII, IX; recorded by all collectors.
- M. anguina* Grt. Ramsey V, 18 (Sleight); Paterson VI, 26 (Gr); Staten Island (Doll).
- M. laudabilis* Gn. Andover VIII (Kr); Newark (Soc); Iona IV, Bridge-ton IX, X, 4 (Coll); Lakehurst IX (div).
- M. lorea* Gn. Ramsey V, 31 (Sleight); Staten Island VI (Ds); Elizabeth VI, 21 (Bz); New Brunswick VI, 11 (Coll); larva on geranium, strawberry, etc. (Bt).

MORRISONIA Grt.

- M. sectilis* Gn. Paterson V, 12, on bark of chestnut (Gr); Newark IV 28-V, 2 on willow bloom (div); Elizabeth IV (Bz); Staten Island IV (Ds); the variety "vomarina" Grt. occurs with the type.
- M. confusa* Hbn. Ramsey V, 13 (Sleight); Paterson V, 5, Plainfield V, 18 (Gr); Caldwell (Cr); Newark V, 1 (Soc); Elizabeth IV (Bz); larva on willow, in webbed-up leaves.

ULOLONCHE Sm.

- U. modesta* Morr. Great Notch. DaCosta V. 17. Brown's Mills V, 19 (Dke); Lakehurst V (Ds); and probably throughout the State, rarely.

NEPHELODES Gn.

- N. minians* Gn. Throughout the State VIII, IX, often on golden rod; the larva is sometimes locally injurious as a cut-worm on corn and other grasses. The variety "violans" Gn. is locally more common than the type form.

LEUCANIA Ochs.

The larvæ of all the species of this genus feed on grasses and a number of them are injurious.

- L. pseudargyria* Gn. Throughout the State IV-IX; common but not injurious.
- L. luteopallens* Sm. (*pallens* L.) Ramsey IX, 21 (Sleight); Newark VII (Wdt); Elizabeth VIII, 4 (Bz).
- L. albilinea* Hbn. Common throughout the State V-IX; the larva is known as the "wheat-head" army worm; attacking the grain just as it is ripening and sometimes causing serious trouble in the more northern parts of the State.
- L. diffusa* Wlk. Paterson V, 20 (Gr); Elizabeth VII, VIII (Bz); 5-mile beach VIII, 20 (Haim); has been confused with the preceding and probably has much the same distribution.
- L. ligata* Grt. Manumuskin V, 5 (Dke).
- L. flabillis* Grt. Newark at light, VII (Wdt); Elizabeth IX, 15 (Bz); 5-mile beach VII, 25-VIII, 5 (Haim); always rare.
- L. insueta* Gn. Hopatcong (Pm); Jersey City VI, common (Kr); probably occurs throughout the State.
- L. extincta* Gn. Newark (Ang); Elizabeth V, VII (Bz); 5-mile beach VIII, 12 (Haim).
- L. multilinea* Walk. Newark meadows, at sugar (Sb); Elizabeth VI, VIII (Bz); Staten Island VI-IX (Ds); 5-mile beach VIII, 27 (Haim).
- L. commoides* Gn. New Brunswick (Coll); Anglesea VIII, IX (div).
- L. phragmatidicola* Gn. Throughout the State V, IX; usually common.
- L. unipuncta* Haw. Throughout the State from May until frost. The larva is the "army-worm," which is seasonally and locally destructive. Remedial measures consist of barriers and mechanical methods adapted in each instance to the case in hand.



Fig. 188.—The "wheat-head" army worm, *Leucania albilinea*.

Fig. 189.—*Mamestra picta*: *a*, the "zebra caterpillar;" *b*, moth.

Fig. 190.—"Wheat head" army worm: *a*, *a*, larvæ at work on wheat head; *b*, egg mass; *c*, *d*, egg from above and side, enlarged.

Fig. 191.—Army worm at work.

Fig. 192.—Army worm moth, *Leucania unipuncta* and details.

Fig. 193.—*Heliothis armiger*: *a*, *b*, egg enlarged, from side and above; *c*, larva; *d*, pupa in underground cell; *e*, adult, wings spread; *f*, same, wings closed.

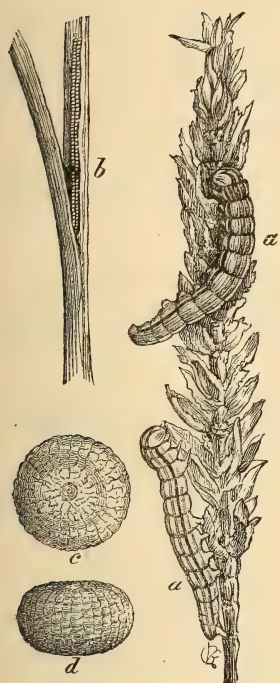


Fig. 190.

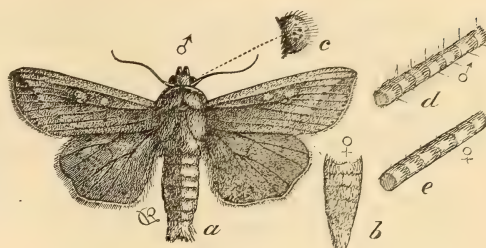


Fig. 192



Fig. 189.

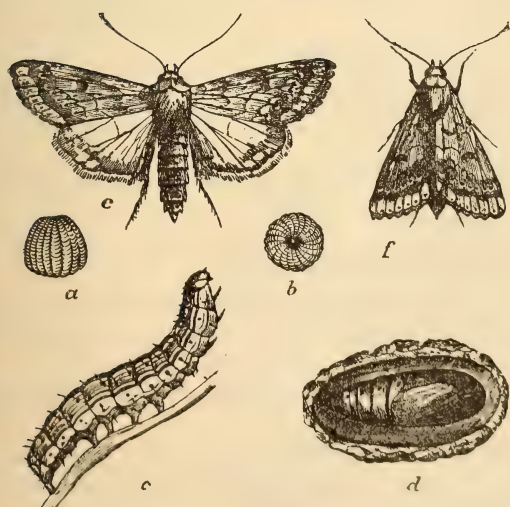


Fig. 193.



Fig. 191.

ORTHODES Gn.

- O. crenulata* Butl. Hopatcong to Cape May VI-VIII; more or less common throughout the State.
- O. cynica* Gn. Hopatcong (Pm); Jersey City at sugar VI (Kr); Newark V, VI (Wdt); Elizabeth VI, VIII (div); Staten Island V, VI (Ds).
- O. imora* Strck. Ramsey X, 22, at light (Sleight); this species is unknown to me (Sm).
- O. vecors* Gn. Hopatcong (Pm); Newark V-VIII (div); Elizabeth V (Bz); Staten Island VI, VIII (Ds).

HIMELLA Grt.

- H. contrahens* Wlk. "Northern New Jersey."
- H. intractata* Morr. Paterson IV, 20 (Gr); Newark IV (div); Staten Island IV (Ds).

CROCIGRAPHA Grt.

- C. normani* Grt. Newark IV, on willow catkins (Sb) and probably throughout the northern part of the State.

TÆNIOCAMPA Ochs.

- T. furfurata* Grt. Paterson V, 17 (Gr).
- T. culea* Gn. Paterson V, 20, Plainfield V, 19 (Gr); Newark (Ang).
- T. oviduca* Gn. Common throughout the State VIII & IX.
- T. rubescens* Wlk. Newark, Elizabeth IV (Bz).
- T. alia* Gn. Throughout the State, late in fall and again from March to May; larva a general feeder in early spring (Dyar).
- T. subterminata* Sm. With the preceding and probably as widely distributed; Newark and Elizabeth IV on willow blossoms (div).

TRICHOLITA Grt.

- T. signata* Wlk. Andover VIII (Kr); Newark (Ang), Staten Island VIII, 23 (Fulda); 5-mile beach IX, 4 (Haim).

XYLINA Ochs.

- X. bethunei* G. & R. Throughout the State, and one of the most common forms.
- X. innominata* Sm. With the preceding; but less common and more generally restricted to the northern half of the State.
- X. ferrealis* Grt. Hopatcong (Pm); New Brunswick IV (Coll).
- X. signosa* Wlk. Hopatcong (Pm); Caldwell (Cr).
- X. fagina* Morr. Chester (Dn); Ramsey X, 22, at light (Sleight).
- X. unimoda* Lint. Ramsey II, 13 (Sleight); Newark (Ang); Staten Island (Ds).
- X. laticinerea* Grt. Ramsey X, 19 (Sleight); Hopatcong (Pm); Carlstadt VIII, 20 (Wrms); Staten Island II-V and X, XI (Ds); larva on soft maple (Dyar), cherry and other trees. Probably occurs throughout the State.

- X. grotei** Riley. Hopatcong (Pm); Paterson X, 24, New Brunswick III, 23 (Gr); Newark IV (Bz).
- X. antennata** Wlk. Throughout the State in late fall and early spring; the commonest of our species. As in all the other species of this genus, the adults occur in late fall and hibernate in that stage, re-appearing for flight and oviposition early next spring. The food plants include, among others, apple trees, and some injury has been caused by the larvæ eating into the forming fruit.
- X. thaxteri** Grt. Newark (Sb).

LITHOLOMIA Grt.

- L. napæ** Morr. Forest Hill IV, 20 (Wrms); rare near New York (Bt), and probably throughout northern New Jersey.

CALOCAMPA Steph.

- C. nupera** Lint. Occasional in northern New Jersey.
- C. cineritia** Grt. Newark III and IV, on willow catkins; larvæ in September on low willows (Sb).
- L. curvimacula** Morr. Staten Island IV (Ds) and occasional in North Jersey.

CUCULLIA Schrank.

- C. convexipennis** G. & R. Newark and northward VI-VIII (div); Staten Island VII-IX (Ds); often on golden rod.
- C. asteroides** Gn. Hopatcong to Cape May and elsewhere throughout the State VII-IX; usually on golden rod.
- C. intermedia** Speyer. Hopatcong (Pm); Newark VIII (Wdt).
- C. philæ** Sm. Taken in Fairmount Park, Phila., and will certainly occur in New Jersey.

BELLURA Wlk.

- B. gortynides** Wlk. Passaic Co. VIII, 29 (Kell); New Durham VIII, 29 (Wrms); Elizabeth VIII, 9 (Bz); Newark district; larva in stems of "Typha," rare.
- B. obliqua** G. & R. Newark V, VII, common; larva in cat-tails; easily taken during the winter when the stems are frozen in ice.

NONAGRIA Ochs.

- N. oblonga** Grt. Elizabeth VII (Bz).
- N. subflava** Grt. Rare near Newark (Soc); seasonally common near Jersey City (Wrms).
- N. læta** Morr. Described from "Hoboken."

OMMATOSTOLA Grt.

- O. lintneri** Grt. Anglesea in late August and September, sometimes common at light and during the day found at rest in the bath houses.

FAGITANA Wlk.

- F. littera** Grt. Hopatcong (Pm); Jersey City VII, at sugar (Kr); Newark (Soc), and probably rare throughout the State.
- F. u-album** Gn. Occurs rarely throughout the State.

ACHATODES Gn.

- A. zeæ** Harr. Throughout the State; the larva boring in corn, wheat and other grasses. It is sometimes rather plentiful in the larval stage, but has never yet been seriously injurious.

APAMEA Tr.

The two species placed here were among those referred to "Hydroecia" in the previous edition. The larvæ are borers, and not often found except on special search. The adults are not uncommon and are attracted to light.

- A. velata** Wlk. Throughout the State VI-VIII, sometimes common.
- A. americana** Speyer. (*atlantica* Sm.) Throughout the State in July and August. The larva bores in the stems of grasses.

HYDRŒCIA Tr.

- H. immanis** Gn. Local in the northern parts of the State; the larva in the crown roots of hops. Dates of flight are in August and September.

PAPAPEMA Sm.

The species here referred constitute the bulk of those previously referred to "Hydroecia." All of them are borers in the larval state, and most of them are by no means rare if properly sought for; but most of them inhabit plants of no economic importance, and therefore do not become obtrusive. The adults are rarely seen, and while they are quite handsome and conspicuous moths, few collections have more than a scattering representation of species. Mr. Henry Bird, of Rye, N. Y., has made a special study of this genus, and to him I owe the information concerning food plants.

- P. appasionata** Harv. Lakehurst (Jtl). The larva bores in the roots of pitcher plants, and the species will probably be found wherever this plant occurs.
- P. marginidens** Gn. Staten Island IX (Ds); Elizabeth IX, 15 (Bz), New Brunswick IX, 12 (Gr). Mr. Bird reports that he finds the larva everywhere in "*Sicuta maculata*."
- P. furcata** Sm. Hopatcong (Pm); Carlstadt, where the larva has been found boring in the young shoots of ash, by Mr. Doll.
- P. circumlucens** Sm. Newark, and elsewhere in New Jersey. It has been confused with "*marginidens*," and probably occurs wherever its food plant, hop, is found.

- P. duovata** Bird. The larva bores in the golden rod, "*Solidago semper-virens*," and will probably be found where this plant occurs.
- P. impecuniosa** Grt. Staten Island, the larva in "*Aster puniceus*" (Ds); aster and helenium are general food plants according to Bird, and the species probably occurs throughout the State.
- P. inquæsitâ** G. & R. Hopatcong (Pm); Elizabeth IX, 30 (Bz); Staten Island (Ds); August and September. The larva in the roots of sensitive fern (Bird).
- P. speciosissima** G. & R. Ridgewood VIII, 30; Newark (Soc); Elizabeth X, 1 (Bz). A rare species, whose larva has thus far escaped detection.
- P. frigida** Sm. The larva lives in the meadow Rue, and no doubt occurs in New Jersey.
- P. sciata** Bird. Newark IX, 5 (Sb); Elizabeth X, 5 (Bz), and probably elsewhere in the State. The larva bores in "*Veronica virginica*," and this is the species listed as "*limpida*" in the previous edition.
- P. cerussata** Grt. Newark IX, 28 (Sb); Staten Island (Ds). The larva bores in iron weed and probably occurs wherever that plant grows.

P. nitela Gn. Throughout the State and sometimes common. The normal food plant is the rag-weed, "*Ambrosia trifida*," but it may infest dock and other of the weedy plants. Sometimes it becomes excessively abundant and then attacks potato, tomato, aster, dahlia, corn and a great variety of other plants, causing local injury. Gardens and small plant-

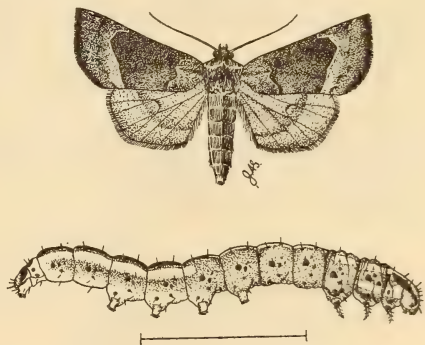


Fig. 194.—*Papipema nitela*: larva and adult.

ings are most generally infested, and as a rule where they adjoin a weedy road or field. Adults occur from late July to September, and a good general measure to prevent trouble is to keep down the rag-weeds by mowing in early July.

- P. duplicata** Bird. The larva breeds in horse balm, "*Colensonia canadensis*," and will almost certainly be found in the State.
- P. imperturbata** Bird. Bores into the stems of the wild sunflower, "*Helianthus divaricatus*," and should occur in New Jersey.
- P. necopina** Grt. The larva bores in the stalks of the wild sunflower, "*Helianthus giganteus*," and the species will no doubt be found there whenever sought for. An adult is very rarely taken even where the larva is abundant.

- P. eupatorii* Lyman. The larva bores in "Eupatorium purpurea," and will probably be found in New Jersey.
- P. pterisii* Bird. The larva in brake or high fern, "Pterisia aquilina." This species very closely resembles "harrisii," and some of the records for that species will without much doubt be found referable here.
- P. harrisii* Grt. Newark (Sb); Elizabeth IX (Bz). The larva bores in "Heracleum lanatum."
- P. purpurifascia* G. & R. Elizabeth IX (Bz), Staten Island (Ds), and probably throughout the more northern parts of the State where the wild columbine grows; the larva bores in the roots of that plant.
- P. baptisiæ* Bird. The larva bores in the false indigo, "Baptisia tinctorum," and undoubtedly occurs in New Jersey. Mr. Davis has taken it on Staten Island.
- P. astuta* Bird. The larva bores in horse balm, "Colensonia," and will almost certainly be found in New Jersey.
- P. cataphracta* Grt. Caldwell (Cr); Newark (Soc); Staten Island (Ds); Anglesea (Lt); generally distributed throughout the State. The larva is a general feeder in thistle, burdock, elder, sunflower and other weeds, the adult flying in September.
- P. rigida* Grt. This will probably be found in the northern part of the State as the southerly limit of its distribution; it flies in September.
- The species recorded as "rutila" in the previous edition probably refers to one of the other, similar forms. Mr. Bird has not met with it in his collections and considers it a more northern type. The Canadian collectors get it not uncommonly.

PYRRHIA Hbn.

- P. umbra* Hbn. Caldwell (Cr); Newark VI (Sb); Elizabeth VII (Bz); Staten Island VII-IX (Ds); 5-mile beach VII, 28 (Haim); larva on "Desmodium" and blackberry.
- P. exprimens* Wlk. With the preceding, but rarely.

XANTHIA Hbn.

- X. flavago* Fab. Recorded as rare near New York by Beutenmuller.

IODIA Hbn.

- I. rufago* Hbn. Newark IV, on willow bloom (Sb); Lakehurst IV (Ds).

MESOLOMIA Sm. (BROTOLOMIA.)

- M. iris* Gn. Hopatcong (Pm); Jersey City (Sb); Newark VI (div).

TRIGONOPHORA Hbn.

- T. periculosa* Gn. Chester (Dn); Hopatcong (Pm); Cresskill VIII, 30 (Wrms); Paterson IX, 21 (Gr); Lakehurst IX (Ds). The variety

"v-brunneum" Grt. occurs with the type, and both are probably found throughout the State.

CIRROEDIA Gn.

- C. pampina* Gn. Newark and Orange Mts. IX (div); Bayonne (Bt); Elizabeth IX, X (div); Staten Island V, IX, X (Ds); New Brunswick IX, 20, Lakehurst IX, 27 (Gr).

SCOLIOPTERYX Germ.

- S. libatrix* Linn. Throughout the State. Matures in early fall, hibernates as an adult and lives until well along in summer; larva on willow and poplar.

COSMIA Ochs.

- C. paleacea* Esp. Chester (Dn).

ORTHOSIA Ochs.

The species now referred to this genus are only a part of those in the previous edition. Most of them have been separated under the term "Amathes" Hbn., leaving the larger, more robust species under the present term.

- O. aurantiago* Gn. Ramsey IX, 5, at light (Sleight); Elizabeth VIII, 20 (Bz).
O. helva Grt. Throughout the State, VII and VIII, recorded by all contributors from Hopatcong to 5-mile beach.
O. lutosa Andr. Newfoundland VII, 2 (Shoemaker), and also recorded from "New Jersey" without specific locality.
O. americana Morr. Described from New Jersey, was based on a European example, and "*O. conradi*" Grt., also recorded from the State, was undoubtedly an error of determination or locality.

AMATHES Hbn.

The species referred here appeared under "Orthosia" in the last edition.

- A. bicolorago* Gn. Throughout the State, locally common, September to October; hibernates as an adult and appears again early next spring. The variety "ferruginoides" Gn. is really much the most abundant form of the two.
A. decipiens Grt. Elizabeth X, 19 (Kp).
A. euroa G. & R. Should be found in the northern part of the State.
A. ralla G. & R. Recorded from New Hampshire to North Carolina and sure to be found in New Jersey.

PARASTICTIS Hbn.

- P. discivaria* Wlk. Not yet actually found in the State, but almost certain to occur there.

SCOPELOSOMA Curt.

- S. indirecta* Wlk. Caldwell (Cr); Forest Hill III (Wdt); Newark III & IV (div). All the species of the genus mature in fall, hibernate as adults and fly again very early in spring.
- S. moffatiana* Grt. Newark district IV, X, XI (div); Staten Island IV (Ds); larva on witch hazel (Dyar).
- S. pettiti* Grt. Occurs near New York (Bt).
- S. ceromatica* Grt. Recorded from "New Jersey," and Mr. Buchholz has taken it in Bronx Park, N. Y. City; larva on witch hazel.
- S. tristigmata* Grt. Newark, New Brunswick IX (Coll), and probably throughout the State.
- S. walkeri* Grt. Newark IV, on willow bloom and at sugar (Sb); Elizabeth XII, 13 (Bz).
- S. sidus* Gn. Newark district IX (div); Forest Hill IV, 2 (Wrms); Staten Island X, Lakehurst X (Ds).
- S. morrisoni* Grt. Near New York on oak (Bt); Forest Hill IV, 4 (Wrms); Staten Island II, IV (Ds).
- S. devia* Grt. Newark IV (Sb); Elizabeth III, IV (Bz); Staten Island V, X (Ds).

GLÆA Hbn.

- G. viatica* Grt. Ramsey X (Sleight); Staten Island X (Ds); Lakehurst IX, X (div).
- G. inulta* Grt. Caldwell (Cr); Staten Island IX, X (Ds).
- G. signata* French. Recorded from "New Jersey."
- G. sericea* Morr. Ft. Lee (Bt); Newark Dist. X (div); Staten Island X (Ds); Lakehurst IX, 27 (Gr).
- G. carnosa* Grt. Lakehurst X, 19 (Ds); a very rare species.

EPIGLÆA Grt.

- E. pastillicans* Morr. Found near New York (Bt).
- E. apiata* Grt. Should be found in New Jersey.
- E. decliva* Grt. Newark (Ang); Elizabeth IX, 13 (Bz).

HOMOGLÆA Morr.

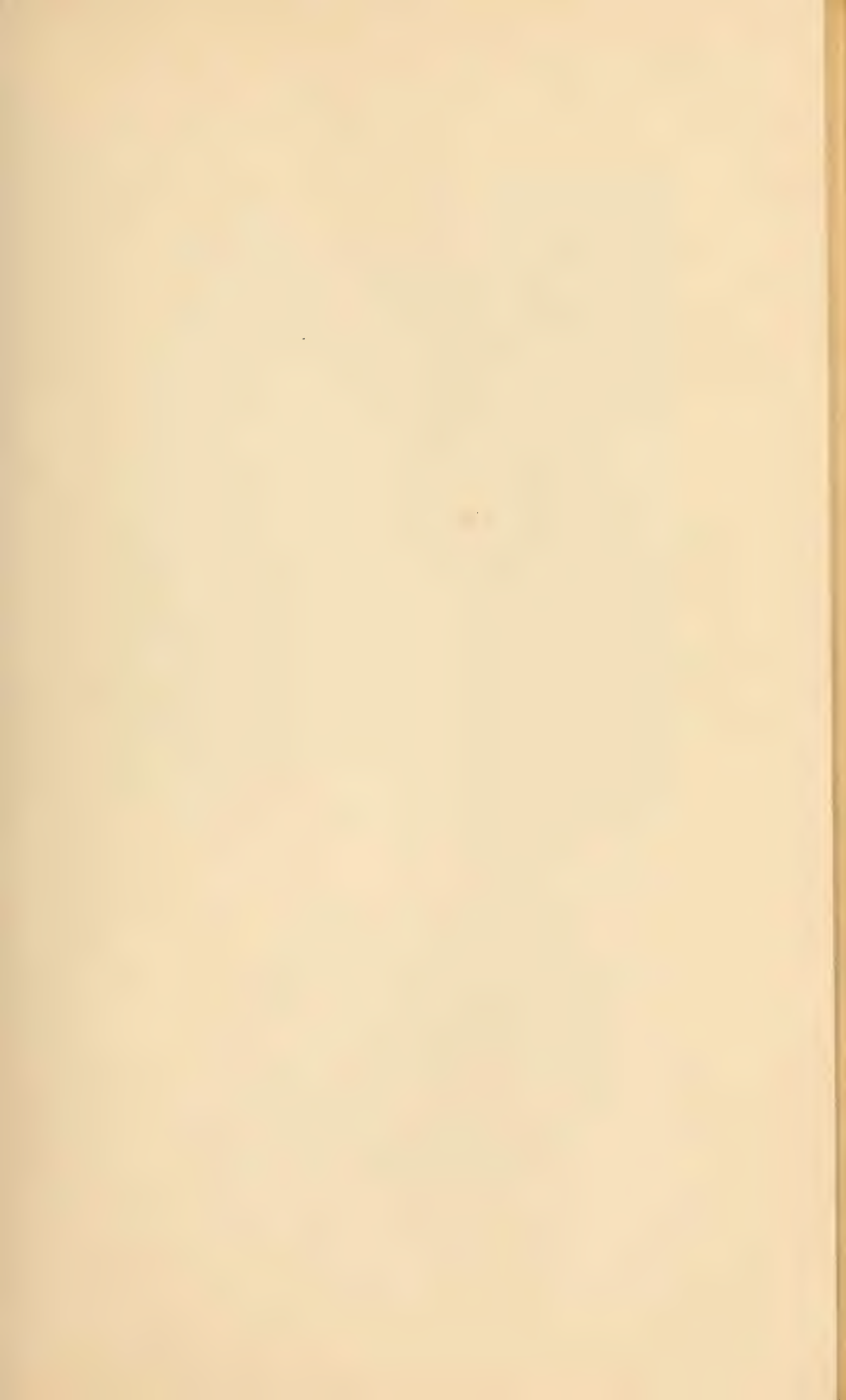
- H. hircina* Morr. Lakehurst IX, on huckleberry leaves (Ds).

CALYMNIA, Hbn.

- C. orina* Gn. Will yet be found in the State, I believe.

IPIMORPHA Hbn.

- I. pleonectusa* Grt. Newfoundland VII, 28 (Ds), and recorded from "New Jersey."



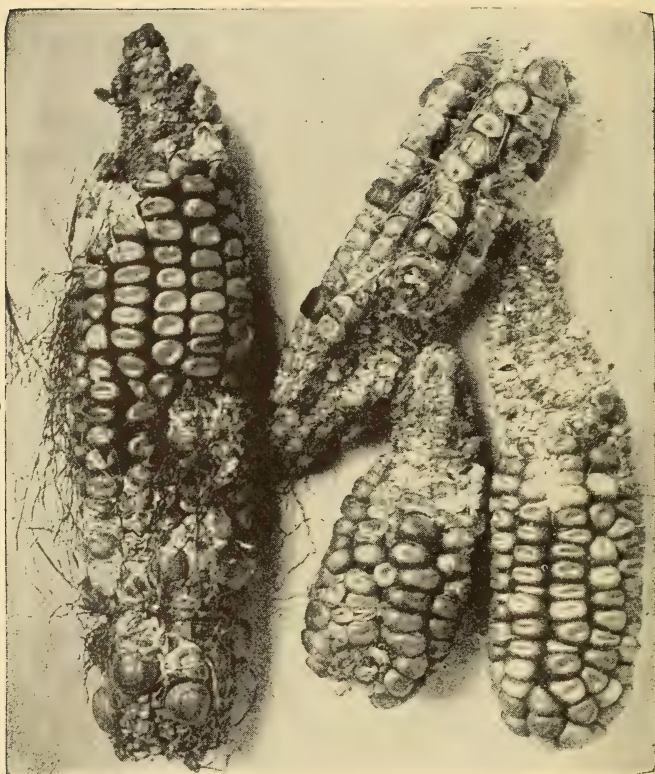


Fig. 195.—Work of the corn-worm in field corn.

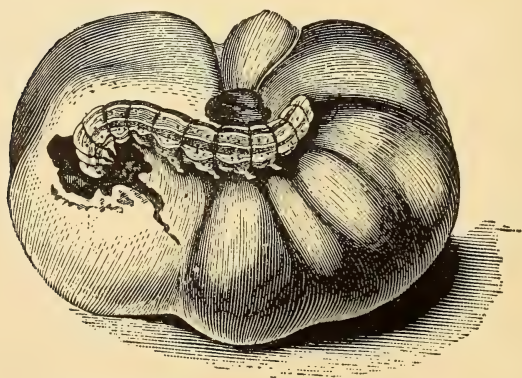


Fig. 196.—Work of the corn-worm in tomato.

ATETHMIA Hbn.

- A. *rectifascia* Grt. Ramsey VIII, 14 (Sleight); Elizabeth VII, 16 (Bz); "New Jersey" (Auct).

CHLORIDEA Westw.

- C. *virescens* Fab. Staten Island VIII, IX (Ds).

HELIOTHIS Ochs.

- H. *armiger* Hbn. Throughout the State and throughout the season. There are three broods in the southern half of the State, the earliest larva being the "tomato worm," which bores into the earliest fruit, while the later broods infest first sweet and then field corn, specimens being found in the ears as late as October. Early in the spring the larva may also bore into pea-pods and attack a variety of other vegetation. They winter as pupæ in cornfields, and the best check to their increase is late fall plowing, which exposes and destroys them in this helpless stage. The application of insecticides has not been found practical.

RHODOPHORA Gn.

- R. *florida* Gn. Throughout the State, VII and VIII in the closed flowers of the evening primrose; the larva feeds in the buds and seed capsules of the same plant.

DERRIMA Wik.

- D. *henrietta* Grt. "New Jersey" without date or exact locality.

EUPANYCHIS Grt.

- E. *spinosæ* Grt. (*Schinia*) Staten Island IX (Ds); Sandy Hook (Bt); Atco IX, 4 (Kp); Clementon IX, 9 (Lt); Lucaston IX, 12, Hammon-ton IX, 6, Brown's Mills IX, 15 (Dke); Lakehurst IX, 10 (Bz); Anglesea IX, 20 (Coll).

SCHINIA Hbn.

- S. *trifascia* Gn. Caldwell (Cr); Elizabeth VIII, IX (Bz); Staten Island VII, VIII (Ds); New Brunswick (Coll) and probably throughout the State.
- S. *nundina* Dru. Throughout the State VIII and IX; not common, but reported by all collectors from Hopatcong to Anglesea; found during the day on flowers of "*Spiræa*," etc.
- S. *lynx* Gn. Elizabeth VI (Bz); Staten Island VI (Ds); Atco IX, 1 (Kp); Brown's Mills VII, 5, DaCosta VIII, 3, Delair VIII, 7, Manumuskin VIII, 17 (Dke); Anglesea VIII, 16 (Lt).
- S. *arcifera* Gn. Orange Mts. VIII, IX (div); Elizabeth VIII, IX (div); Staten Island VIII, IX (Ds); New Brunswick VIII, IX (Coll); Ft. Lee VIII, 30, Belleplain IX, 16 (Dke); 5-mile beach VIII, 21-IX, 20 (Haim).

LYGRANTHOECIA G. & R.

The species referred to this genus appeared under "Schinia" in the previous edition.

- L. thoreau* G. & R. Newark VIII, 25 (Ang); Elizabeth VIII (Bz); New Brunswick VIII, 20 (Gr).
- L. marginata* Haw. Common throughout the State and practically throughout the season; usually attracted to light.
- L. brevis* Grt. Ramsey IX, 5 (Sleight); Newark, Orange Mts. VIII, IX (div); Elizabeth IX, 5-20 (Bz); Staten Island VIII, IX (Ds); locally common.
- L. inclara* Strck. Paterson (Gr); Woodbury VI, 18 (Kp).

XANTHOPASTIS Hbn.

- X. timais* Cram. Staten Island, taken by Mr. Grote (Ds); a southern species which is occasionally taken at light along the shore.

EUTHISANOTIA Hbn.

The species referred here appear under "Eudryas" in the previous edition, and are there associated with the family "Agaristidæ," which they resemble greatly in the larval stage. The present genus was used for the species just preceding.

- E. unio* Hbn. Throughout the State, locally more or less abundant, VI and VIII; larva on evening primrose and "Epilobium."
- E. grata* Fab. Also generally distributed and local, VI and VII; the larva on grape and Virginia creeper.

PLAGIOMIMICUS Grt.

- P. pitychromus* Grt. Newark (Wdt); Elizabeth VIII (Bz); Staten Island VIII (Ds).

STIBADIUM Grt.

- S. spumosum* Grt. Has been found in New Jersey.

CIRRHOPHANUS Grt.

- C. triangulifer* Grt. Ft. Lee VIII, 30 (Dke); Caldwell (Cr); Newark (Soc); Elizabeth IX, 15 (Bz); Staten Island VIII (Ds); New Brunswick VIII, 2 (Gr).

PLUSIODONTA Gn.

- P. compressipalpis* Gn. Paterson VI, 2 (Gr); Newark VII (Wdt); Elizabeth VIII, IX (div); Staten Island VIII (Ds); Merchantville VIII, 1 (Dke); the larva resembles bird excrement (Dyar) and is found on "Menispermum canadense."

CALPE Tr.

- C. canadensis* Beth. Ramsey VI, 7 (Sleight); Paterson VII, 10 (Gr); Ft. Lee (Dyar); Newark VI (Bz); Staten Island VI, VIII (Ds); larva on meadow-rue.

POLYCHRYSLA Hbn.

- P. formosa* Grt. Hopatcong VII, 4 (Gr); Newfoundland VII, 5 (Ds); Union Hill, Edgewater VIII, 4 (Wrms); Newark (Soc); always rare.

PANCHRYSLA Hbn. (DEVA.)

- P. purpurigera* Wlk. Elizabeth VII, 7, 1 spec. (Bz); rare near New York (Bt); larva on meadow rue.

PLUSIA Ochs.

- P. ærea* Hbn. Newark, Orange Mts., Elizabeth VI-IX (div); Staten Island VI-IX (Ds); New Brunswick VIII, 28 (Gr), and probably throughout the State; larva on verbena.
- P. æroides* Grt. Jersey City VII, VIII (Kr).
- P. balluca* Geyer. Newark, rare (Ang); the larva on hop.

EUCHALCIA Hbn.

- E. contexta* Grt. Caldwell (Cr); Newark VII, VIII (div); Elizabeth VII-IX (Bz); Staten Island VII (Ds).
- Ē. putnami* Grt. Recorded from "New Jersey."
- E. venusta* Wlk. Newark, at light (Ang).

EOSPHOROPTERYX Dyar.

- E. thyatiroides* Gn. Hopatcong (Pm); Carlstadt VIII, 11 (Wrms); Newark (Ang); Staten Island VII (Ds); always rare.

AUTOGRAPHA Hbn.

This genus contains most of the species referred to "Plusia" in the previous edition; the others are distributed in the four genera immediately preceding. Many of the moths fly during the day, and are recognizable by angular silvery marks or blotches on the fore-wings. The larvæ are semi-loopers, and some of them are of economic importance.

- A. bimaculata* Steph. Newark, on petunias (Ang).
- A. biloba* Steph. Newark V, VIII (div); Staten Island VI, VIII (Ds); Woodbury VII, 7 (Kp).
- A. verruca* Fabr. Hemlock Falls, Newark V (Sb); Greenville, seasonally common (Sm); Staten Island X (Ds).
- A. rogationis* Gn. Near New York on wandering jew, geranium and "Eupatorium" (Bt); and I have seen specimens taken in New Jersey.
- A. precatationis* Gn. Throughout the State V-X, common; it is double-brooded, the larva on a variety of low weedy plants.

A. ou Gn. Rutherford IX, 3 (Wrms); Newark X, 7 (Kp).

A. brassicæ Riley. Throughout the State, all season; the larva a gen-

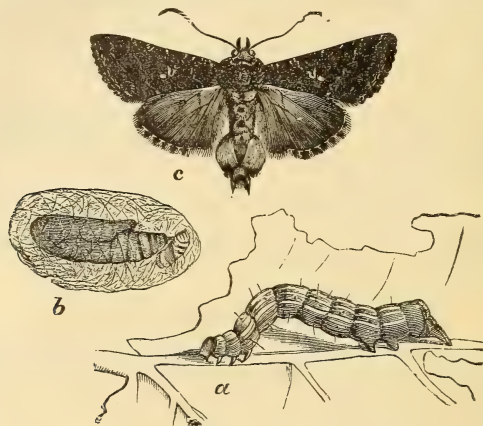


Fig. 197.—The cabbage looper, *Autographa brassicæ*; a, larva; b, pupa in its flimsy cocoon; c, male moth.

eral feeder on cruciferous plants and seasonally injurious to cabbage. It is known as the "cabbage looper" because it lacks one pair of abdominal legs, and it becomes most troublesome late in the season. It resists spraying mixtures quite strongly, but the bran and Paris green application is usually successful.

- A. oxygramma* Geyer. Rare near New York (Bt); Newark X, 7(Kp); Lakehurst IX, 17 (Ds).
- A. rectangula* Kirby. (*mortuorum* Gn.) Newark VII, VIII (div) "New Jersey."
- A. epigæa* Grt. Rare near New York (Bt).
- A. falcifera* Kirby, var. *simplex* Gn. Throughout the State, commonly V–XI; it is double-brooded, the larva feeding on a great variety of cruciferous and other low plants.
- A. basigera* Wlk. Hopatcong (Pm); Newark, VI, IX, X (div); Staten Island VII, VIII (Ds); never common.

ABROSTOLA Ochs.

- A. ovalis* Gn. Newark (Sb).
- A. urentis* Gn. New Brunswick; probably rare throughout the State.

OGDOCONTA Butl.

- O. cinereola* Gn. Throughout the State, all season, common; larva on ragweed.

PÆCTES Hbn. (INGURA).

- P. delineata* Gn. Newark (div); Morris Plains, larva on sweet gum (Dyar).
- P. abrostoloides* Gn. Newark (Sb); Elizabeth VIII, IX (div); Staten Island VI–IX (Ds); hardly common.

- P. oculatrix** Gn. Ramsey V, 21 (Sleight); Hopatcong (Bt); Caldwell (Cr); Newark VII, 1 (Bz); Staten Island VIII (Ds); Weymouth VIII, 9 (Dke); 5-mile beach VIII, 5 (Haim).

EUTELIA Hbn.

- E. pulcherrima** Grt. Newark, at night (Ang); Ramsey, VI, 17 (Sleight); always rare.

MARASMALUS Grt.

- M. inficita** Wlk. Ramsey VI, 12 (Sleight); Caldwell (Cr); Newark VII, 7 (Sb); Elizabeth VIII (Bz); Staten Island VI (Ds); 5-mile beach VI, 6, VIII, 3 (Haim).
- M. ventilator** Grt. Ramsey VI, 5 (Sleight); Newark (Soc), New Brunswick VIII, 18 (Coll); 5-mile beach VIII (div); larva on poison ivy. Both of these species occur throughout the State.

ALETIA Hbn.

- A. argillacea** Hbn. Newark IX, X (Wdt); Elizabeth IX, X (Bz); Staten Island IX, X (Ds); Long Branch (U S Ag); 5-mile beach VIII, X (Haim). This is the famous cotton-moth of the Southern States. It does not breed in New Jersey; but each year adults fly north in considerable numbers after midsummer, and some of these flights reach us, as a swarm or in scattering individuals.

ANOMIS Hbn.

- A. erosa** Hbn. Newark X (Wdt); Elizabeth X, 3 (Bz); Staten Island X (Ds); the larva on cotton and mallow. This is also a Southern species which reaches New Jersey as a visitor only.

SCOLECOCAMPA Gn.

- S. liburna** Geyer. Ft. Lee (Bt); Newark and Orange Mts. VII (div); Elizabeth VII (Bz); Staten Island (Ds); the larva in decaying cherry, hickory, oak and chestnut stumps.

EUCALYPTERA Morr.

- E. bipuncta** Morr. Suffern VII, Newark, Lakehurst VII, 17 (Bz); Lacey VII, Bamber VII, 11 (Dke); Anglesea in July, on salt marshes and in swamps; the larva probably boring in reeds or grasses.

AMOLITA Grt.

- A. fessa** Grt. Hopatcong to Cape May VI-VIII; nowhere common.

DORYODES Gn.

- D. bistrialis** Geyer. Secaucus V, 22 (Gr); Newark at light V (Wdt); Elizabeth VI, IX (Bz); Staten Island V-VIII (Ds); Anglesea, common on the salt marshes VI-IX (Sm).

PHIPROSOPUS Grt.

- P. callitrichoides* Gn. Elizabeth VII, VIII (div); Staten Island VI, VIII (Ds); Alloway VI, 3, Lucaston IX, 9, the larva on "Smilax rotundifolia" (Dke); 5-mile beach VIII (Haim).

RIVULA Gn.

- R. propinqualis* Gn. Paterson (Gr); Newark VI, IX, Elizabeth VI, VII (div); 5-mile beach VII, 24 (Haim); probably throughout the State.

PLEONECTYPTERA Grt.

- P. pyralis* Hbn. New Brunswick VII (Coll).
P. geometralis Grt. Staten Island VII (Ds); Lahaway VIII, 3 (Coll).

ERASTRIA Ochs.

- E. malaca* Grt. Elizabeth VII, 15 (Bz).
E. albidula Gn. New Brunswick (Coll).
E. concinnimacula Gn. Caldwell (Cr); Staten Island V (Ds).
E. synochitis G. & R. Throughout the State V-VII, locally common.
E. olivula Gn. Newark (Wdt); common near New York (Bt).
E. musta G. & R. Newark at light VIII (Wdt); 5-mile beach VIII (Haim).
E. muscosula Gn. Common throughout the State VI-VIII.
E. caduca Grt. Jamesburg VII, larva on "Sagittaria" (Sm).
E. apicosa Harv. Throughout the State V-IX, common.
E. carneola Gn. Common everywhere V-IX; our most abundant species.
E. aerea Grt. Newark VI (Wdt); Elizabeth VI, VII (Bz).

GALGULA Gn.

- G. hepara* Gn. Throughout the State VI-X, usually not rare; the variety "partita" Gn. occurs with the type.

LITHACODIA Hbn.

- L. bellicula* Hbn. Throughout the State V, VII-IX, not rare; reported by all collectors.

PROTHYMIA Hbn.

- P. rhodarialis* Wlk. Paterson V, 18 (Gr); New Brunswick, Anglesea (Coll), and probably throughout the State.
P. semipurpurea Wlk. Paterson V, 18 (Gr); Elizabeth V, VII, VIII, IX (div); Laurel Springs V, 23 (Dke).

EXYRA Grt.

- E. semicrocea* Gn. Lucaston V, 30, Iona V, 26 (Dke); Pleasantville VI, 13 (Lt); Lahaway V, larva in "Sarracenia."

XANTHOPTERA Gn.

- X. nigrofimbria* Gn. Lucaston IX, 14, Manumuskin VIII, 17 (Dke); 5-mile beach VIII (div).
X. semiflava Gn. 5-mile beach VIII, 19 (Haim), and probably throughout South Jersey.

METOPONIA Dup.

- M. obtusa* H. S. Caldwell (Cr); Newark, Elizabeth, VI, VII (Bz); Staten Island V, taken by O. Fulda (Ds).

CHAMYRIS Gn.

- C. cerintha* Tr. Throughout the State V-IX, sometimes common, and reported by all collectors; larva on wild cherry, plum, apple and other trees, but never in destructive numbers.

ACONTIA Ochs.

- A. terminimacula* Grt. 5-mile beach VII, 26 (Haim).
A. delecta Wlk. Little Ferry VIII, 19 (Wrms); Elizabeth V, VII, VIII (Bz); Staten Island VI (Ds); Stone Harbor VIII, 12 larva, V, 16 adult (Dke); Cape May (Lt); larva on swamp mallow "*Hibiscus moschatus*."
A. biplaga Gn. 5-mile beach IX, 4 (Haim).
A. erastrioides Gn. Common throughout the State and actually recorded from all points between Delaware Water Gap and Cape May V-IX; larva on rag-weed, burdock, etc.
A. candefacta Hbn. With the preceding and even more common, but not reported later than August; larva as before.

SPRAGUEIA Grt.

- S. onagrus* Gn. Chester VIII, 1, New Brunswick VIII, IX, Anglesea V, IX (Coll); Elizabeth VIII (Bz); locally common at light.
S. leo Gn. Chester (Wdt); Staten Island (Ds); New Brunswick (Coll).
S. dama Gn. Anglesea IX, 8 (Kp).

METATHORASA Moore.

- M. monetifera* Gn. Hopatcong (Bt); Orange Mts. VI (Wdt); Newark (Soc); Staten Island VII, VIII (Ds); Elizabeth VII, 24, Glassboro VII, 3 (Kp); Lahaway (Coll).

EUHERRICHIA Grt.

- E. mollissima* Gn. Jersey City VIII, seasonally common (Kr); Elizabeth VII, VIII (Bz); Staten Island V (Ds); Brown's Mills (Dke); 5-mile beach VII, VIII (div).

PHALÆNOSTOLA Grt.

P. larentoides Grt. Newark VIII (Bwl); Elizabeth VI, VIII (Bz); Westville VI, 6 (Jn); 5-mile beach VI, VII, IX (div).

PANGRAPTA Hbn.

P. decoralis Hbn. Throughout the State V-VII; locally common.

HYAMIA Wlk.

H. perditalis Wlk. Elizabeth VII, VIII (div); Staten Island VII (Ds); Anglesea VII, VIII (div).

H. 6-punctata Grt. Newark (Sb); Hemlock Falls V, Elizabeth VI, VII (Bz); Staten Island V, taken by Fulda (Ds).

MELANOMMA Grt.

M. auricinctaria Grt. Newark (Bwl); has been bred out of sticks containing larvæ of "Eu. unio," and probably feeds on "Cephalanthus."

HOMOPYRALIS Grt.

H. discalis Grt. Paterson VI-VIII (Gr); Newark (Wdt); Elizabeth VII (Bz); Camden VI, VIII (Kp); Anglesea IX (div).

H. contracta Wlk. Caldwell (Cr); Elizabeth VII, VIII (div); Staten Island VI-VIII (Ds); and probably throughout the State.

H. tantillus Grt. Near New York, not common (Bt); Anglesea IX, 3 (Coll).

ISOGONA Gn.

I. natatrix Gn. (*Eutoreuma tenuis* Grt.) Montclair VIII, 11 (Kf); Elizabeth VIII, 7, one specimen (Bz).

HYPsorOPHA Hbn.

H. hormos Hbn. Newark (Soc); Elizabeth VIII (div); Camden VI, VII (Kp); 5-mile beach VIII (div).

DRASTERIA Hbn.

D. erectea Cram. Common throughout the State V-X. The larva feeds on grass, clover, etc., and the moth is the one most usually started up in grassy or weedy lands.

D. crassiuscula Haw. With the preceding but less abundant. The variety "ochrea" Grt. occurs occasionally.

CÆNURGIA Wlk.

C. convalescens Gn. "New Jersey"; Union Co.; single specimens only.

EUCLIDIA Hbn.

E. cuspidea Hbn. Throughout the State V-VIII; locally not uncommon.

MELIPOTIS Hbn.

- M. limbolaris* Geyer. Orange Mts. VI, VII (div); Paterson VI, 28 (Gr); Newfoundland VII, 5, Sandy Hook V, 18 (Ds).
- M. nigrescens* G. & R. Fort Lee VI, 14 (Wrms).
- M. jucunda* Hbn. Hemlock Falls VI, 1 (Sb); Elizabeth VI, VII (Bz); Staten Island V, 29, Lakehurst V, VI (Ds); Manumuskin, common (Dke); 5-mile beach VIII, 1 (Haim).

SYNEDA Gn.

- S. graphica* Hbn. Throughout the pine barrens V-VIII, locally common (div); Staten Island IV-VIII (Ds); Milltown V, 13 (Gr). The variety "media" occurred with the type but less abundantly, at Clementon (Lt).

CATOCALA Schranck.

- C. nubilis* Hbn. Throughout the State V-VIII, locally common; larva on locust (Dyar).
- C. elonympha* Hbn. Staten Island VI, VIII (Ds); Caldwell (Cr); 5-mile beach VIII (div); larva on walnut.
- C. amica* Hbn. (*lineella* Grt.) Caldwell (Cr); Staten Island (Ds); Newark IX (div).

The variety "androphila" Gn. occurs with the type.

- C. jair* Streck. Lakehurst VII, 1-15 (div).
- C. gracilis* Edw. Greenwood Lake (Bt); Newark VIII (Sb); Elizabeth VIII (Kp); Anglesea VIII (div).
- var. *sordida* Grt. Greenwood Lake (Bt).
- C. minuta* Edw. Rutherford (Wrms); Elizabeth VII, VIII (div); Staten Island VII, VIII (Ds); New Brunswick VII, 16 (Gr); 5-mile beach VIII (Haim); the larva on locust.

The varieties "parvula" Edw. and "mellitula" Hulst occur with the type (Bt).

- C. grynea* Cram. Caldwell (Cr); Newark (Sb); Elizabeth VII (div); Staten Island VII, VIII (Ds); 5-mile beach VIII (Haim); larva on apple and plum. Mr. Beutenmuller says that "polygama" Gn. is really this species.
- C. praeclara* G. & R. Caldwell (Cr); Elizabeth VII, 29 (Kp).
- C. micronympha* Gn. Anglesea (Lt).

Mr. Beutenmuller says that the varieties "fratercula" G. & R., "hero" Hy. Edw., and "gisela" Mayer occur on all sides of New Jersey, and should certainly be found in the State with the type. The species is surely rare with us.

- C. similis* Edw. "New Jersey" without date or exact locality: Lakehurst VII, 8 (Ds).

Mr. Beutenmuller has not had the type form, but has had the variety "aholah" Streck. from the State.

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- C. cordelia** Hy. Edw. Roselle (Peck). Mr. Beutenmuller says that the species usually called "amasia" S. & A. is really this form. There is a distinct question as to whether this record can stand. It is probably based on an erroneous identification.
- C. connubialis** Gn. Mr. Beutenmuller says that "sancta" Hulst is this species. The mix-up in the names relating to this "amasia" series is such that I give all the names, since any or all of them may be found represented in New Jersey material.
- C. cratægi** Saund. Rare near New York; larva on thorn.
- C. pretiosa** Lint. Taken in New Jersey and heretofore cited as a variety of "cratægi." Mr. Beutenmuller, however, thinks them distinct.
- C. blandula** Hulst. Caldwell (Cr); larva on "Cratægus."
- C. ultronia** Hbn. Throughout the State, VII-X; the larva on apple, plum, wild cherry, dogwood, oak, etc. According to Mr. Beutenmuller the true "ultronia" is what has been heretofore termed "mopsa" Hy. Edw., and to the form heretofore labeled "ultronia," he has given the varietal name "lucinda." The varieties "celia" Hy. Edw., and "ariadna" Hy. Edw., are also taken in New Jersey; all occurring together at Holly Beach and elsewhere.
- C. herodias** Strck. Lakehurst VII & IX (Ds).
- C. coccinata** Grt. Greenwood Lake (Bt); Lakehurst VII, 8 (Ds).
- C. cerogama** Grt. Newark VII, VIII (div); Elizabeth VIII (Kp); Staten Island VIII (Ds); New Brunswick VIII, 21 (Gr). The variety "bunkeri" Grt. has been taken at Caldwell (Cr).
- C. illia** Cram. Throughout the State VII-IX, common; the larva on oak. The varieties "uxor" Gn. and "osculata" Hulst occur with the type.
- C. marmorata** Edw. Bayonne (Doll).
- C. parta** Gn. Newark VII, VIII (div); Staten Island VII-IX (Ds); New Brunswick IX, 8 (Gr); larva on willow and poplar.
- C. unijuga** Wlk. Newark VIII, IX (Sb); Elizabeth IX (Kp); Staten Island VII-IX (Ds); New Brunswick IX (Gr); Anglesea (Lt).
- C. briseis** Edw. Staten Island VII (Ds); "New Jersey."
- C. cara** Gn. Common throughout the State, VII-X; the larva on willow and poplar. The variety "carissima" Hulst occurs more rarely.
- C. amatrix** Hbn. Throughout the State VII-IX, common; the larva on willow and poplar. The variety "nurus" Wlk. has been taken at Newark and on Staten Island.
- C. concumbens** Wlk. Throughout the State, VIII & IX, sometimes common; larva on willow and poplar.
- C. consors** S. & A. DaCosta VII, 18 (Lt).
- C. antinympa** Hbn. Caldwell (Cr); Newark VIII, IX (Soc); Elizabeth VIII, 14 (Kp); Staten Island VII, VIII (Ds).
- C. badia** G. & R. Englewood (Bt); Newark (Sb); Elizabeth VIII (Kp); Anglesea VIII; larva on wax myrtle.

- C. muliercula** Gn. Newark, VIII (Bwl); Elizabeth VIII (div); Staten Island VIII, IX (Ds); DaCosta VIII (Lt); 5-mile beach VII, VIII (div); larva on wax myrtle.
- C. habilis** Grt. Orange VIII, IX (Sb); Elizabeth IX (Kp); Staten Island VIII (Ds); New Brunswick IX (Gr); the larva on hickory. The variety "basalis" Grt. occurs with the type, but rarely.
- C. serena** Edw. Hopatcong (Pm); Caldwell (Cr); larva on hickory and walnut.
- C. innubens** Gn. Staten Island VII, VIII (Ds); Elizabeth VIII, 12 (Kp); larva on honey locust.
The variety "scintillans" G. & R. occurs with the type.
- C. paleogama** Gn. Throughout the State VII-IX (Bt); the larva on hickory and walnut.
The varieties "annida" Fager and "phalanga" Grt. occur with the type, but are less common; the latter the more abundant of the two.
- C. neogama** S. & A. Caldwell (Cr); Newark VII-IX (div); Staten Island VII-X (Ds); Lucaston VIII, Holly Beach VIII (Haim); larva on butter-nut and walnut.
The variety "snowiana" Grt. is recorded from 5-mile beach VII, 22 (Haim).
- C. subnata** Grt. Caldwell (Cr); Passaic Co. VIII, 2 (Wrms); larva on walnut and hickory.
- C. piatrix** Grt. Paterson IX, 21 (Gr); Caldwell (Cr); Newark VIII, IX (div); Elizabeth VIII (Kp); Staten Island VIII, IX (Ds); larva on walnut, hickory, persimmon.
- C. nebulosa** Edw. Still only a probability.
- C. relictæ** Wlk. Jersey City, Newark and Elizabeth and vicinity, in VII-IX; recorded by many collectors.
The type name, according to Mr. Beutenmuller, refers to the dark form and is the same as "bianca" Hy. Edw. The gray form is "phrynia" Hy. Edw., and the white form is "clara" Beut. All occur in New Jersey. Larva on white birch and silver poplar.
- C. epione** Dru. Newark VII, VIII (Wdt); Elizabeth VII (Kp); Staten Island VII, VIII (Ds); the larva on oak.
- C. robinsonii** Grt. Orange Mts. IX (Sb); Caldwell (Cr); Newark IX (Soc); Elizabeth IX (Bz); Staten Island VIII, IX (Ds); New Brunswick VIII-X (Gr); larva on hickory.
- C. judith** Streck. Ft. Lee Dist. (Bt); Elizabeth VII, 15 (Bz); Staten Island (Fulda); 5-mile beach VII, 22 (Haim); the larva on hickory.
- C. relecta** Grt. Caldwell (Cr); Newark IX (Soc); Staten Island VIII (Ds); larva on hickory.
The variety "luctuosa" Hulst occurs with the type.
- C. flebilis** Grt. Occurs with the preceding and listed as a variety in the last edition.

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- C. dejecta* Strck. Lake Hopatcong, Elizabeth VII, VIII (Bz); Newark (Ang).
C. vidua S. & A. Hopatcong (Pm); Caldwell (Cr); Elizabeth VIII, IX (Bz); Staten Island IX (Ds); New Brunswick VIII, IX (Gr); larva on oak, hickory and walnut.
C. viduata Gn. Orange Mts. IX (Sb); Elizabeth VIII (Kp); Pleasantville (Lt); larva on walnut.
C. lacrymosa Gn. Newark IX, 26 (Sb).
The var. "ulalume" Strck. is recorded from Morristown (Peck).
C. agrippina Strck. Rare near New York (Bt).
C. insolabilis Gn. Caldwell (Cr); larva on hickory.
C. angusi Grt. Ft. Lee Dist. (Bt); Elizabeth VIII, IX (Bz); 5-mile beach VIII, 22 (Haim); larva on hickory.
Mr. Beutenmuller finds the varieties "edna" Beut. and "lucetta" Hy. Edw. with the type near Fort Lee.
C. obscura Strck. Caldwell (Cr); Staten Island VII, VIII (Ds); New Brunswick VIII, 25 (Gr); the larva on hickory.
The variety "residua" Grt. occurs with the type and in addition is recorded from Hopatcong (Pm); Orange Mts. (Wdt); Elizabeth (Kp).
C. tristis Edw. Dover (Jn); Caldwell (Cr); Lahaway (Sm).

HYPOCALA Gn.

- H. andremona* Cram. (hillii Lint.) Staten Island IX, 26 (Ds).

PHOBERIA Hbn.

- P. atomaris* Hbn. Newark IV (div); Staten Island IV, Lakehurst IV (Ds).

HOMOPHOBERIA Morr.

- H. cristata* Morr. Described from "Hoboken" and never since found.

PANAPODA Gn.

- P. rufimargo* Hbn. Throughout the State V-VIII, the varieties "carneicosta" Gn. and "roseicosta" Gn., with the type and equally abundant. Larvæ on upper side of oak leaf (Dyar), and feed also on hickory and willow.

PARALLELIA Hbn.

- P. bistriaris* Hbn. Throughout the State V-VIII; usually not rare.

AGNOMONIA Hbn.

- A. anilis* Dru. Newark (Soc); Staten Island VIII (Ds).

REMIGIA Gn.

- R. repanda* Fabr. (latipes Gn.) Throughout the State, VI and VII-X; sometimes locally not rare.

GRAMMODES Gn.

G. smithii Gn. Elizabeth, VII, 18, 1 specimen (Bz).

POAPHILA Gn.

P. quadrifilaris Hbn. Orange Mts. V, VI (div); Newark (Soc); Staten Island VI, VII (Ds); Clementon V, 15, Brown's Mills V, 9, Manumuskinkin VI, 4 (Dke).

The record for "*deleta*" Gn. was based on a misidentification.

CELIPTERA Gn.

C. frustulum Gn. Throughout the State V-VIII, and sometimes not rare.

PHURYS Gn.

P. lima Gn. I have seen this from New Jersey.

ANTICARSIA Hbn.

A. gemmatilis Hbn. Staten Island IX (Ds).

ANTIBLEMMA Hbn.

A. minorata Sm. South Orange V, 28 (Gr).

PHÆOCYMA Hbn.

Under this term those species referred to in the last edition as "*Zale*," "*Phæocyma*," "*Ypsia*" and "*Homoptera*" are now grouped. The species have been recently studied and revised, and some of the records as they stand are a little uncertain. I have included all the species that I have reason to believe will occur within our faunal area, and have no doubt they will all be found in due course.

P. lunata Dru. Occurs throughout the State, July to October. It is the most common of all the species, and the larva is a general feeder; maple, willow, rose and wild cherry being included in the list. What has been known as "*edusa*" is the male, and the spring records probably refer to "*minerea*" and not to "*lunata*."

P. undularis Dru. Staten Island V-VIII (Ds); Newark V, VI (Br); Elizabeth V, VII (Bz), and probably throughout the State. "*Nigricans*" Beth., recorded as rare throughout northern New Jersey, is this same species. The variety "*umbripennis*" Grt. occurs with the type, but is much less abundant.

P. æruginosa Gn. Probably also throughout the State, but not common. This was referred as a variety of "*undularis*" until recently, and therefore escaped separate record. I have it from Elizabeth, however (Kp), & V, 13 (Bz).

P. minerea Gn. Lakewood V, 27 (Ds), not generally identified in collections; I believe that the May and June records for "*lunata*" will be found to refer to this species.

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- P. lunifera* Hbn. Paterson VII, 14, Guttenberg X, 4 (Wrms); Elizabeth V, 17 (Bz); 5-mile beach VIII, 5 (Haim). This is also referred as "penna" Morr. in the previous edition.
- P. lineosa* Wlk. Some of the records for "lunifera" probably refer to this species, and I have little doubt that both will be found to occur throughout the State, as they are generally mixed in collections. I have seen it from Elizabeth VIII, 6 & 9 (Bwl, Bz).
- P. unilineata* Grt. Staten Island V (Ds); Newark VI (Bwl); not common, and a well-marked species.
- P. obliqua* Gn. Staten Island V, VII, VIII (Ds); Elizabeth (Kp).
- P. metata* Sm. Newark VI, 11 (Bwl); almost undoubtedly confused with the preceding.
- P. curema* Sm. Sure to occur in New Jersey.
- P. helata* Sm. Quite within our faunal range.
- P. squamularis* Dru. Probably confused with "obliqua."
- P. benesignata* Harv. Lakewood V, 3 (Ds).
- P. cingulifera* Wlk. Newfoundland IV, 25 (Ds); Elizabeth V, 29 (Bz).
- P. calycanthata* S. & A. Recorded from Elizabeth; but it is very doubtful whether the species really occurs in the State. I have seen only Georgia and Florida examples myself, and the records probably refer to "lineosa" or "lunifera."
- P. horrida* Hbn. Paterson V, 12 (Gr); 5-mile beach V, 27, VIII, 21 (Haim); Staten Island VI-VIII, and probably throughout the State, locally common.

EREBUS Latr.

- E. odora* Linn. Staten Island VI, IX, 3 specimens, all females (Ds); Newark IX, 4, IX, 26 (div); a wind visitor, occasionally taken near the coast, generally in fall.

PSEUDANTHRACIA Grt.

- P. coracias* Gn. No actual records, but surely to be found in the State; the Elizabeth record of last edition was an error.

TRAMA Harv.

- T. detrahens* Wlk. Laurel Springs VI, 3 (Dke).

Family HYPENIDÆ.

These are the "snout-moths," so called because in many of them the palpi are projected straight forward into a beak, though sometimes they are curved sickle-like over the head. They are also known as Deltoids because many of them, when at rest, have the outline of the Greek letter Δ (delta). They are all obscurely colored moths of small or moderate size, living in woods, among undergrowth or in grassy places. The larvæ of some species lack one pair of abdominal legs; some live on or among

dead leaves or decaying wood, some openly on grasses and other vegetation, and a few have been found in the nests of ants. None of those found in New Jersey are economically important.

In this family sexual modification has run wild; antennæ, feet, palpi and wings being modified in the species. The antennæ of the males have knots, spurs and tufts, often in addition to the more usual pectinations. The legs have a varied assortment of hair pencils and tufts, and some of these are also found on the palpi. In one of our species the fore wings of the male are deeply notched, while in the female they are entire.

It is more than likely that all species recorded from the eastern United States will be found in New Jersey. The moths are difficult to secure in good specimens and are not favorites with collectors, hence are not so well represented in cabinets as are those of some other families.

Sub-family HELIINÆ.

EPIZEUXIS Hbn.

- E. lubricalis** Geyer. Common throughout the State from June to September. The larva on grasses (Bt) and in decayed wood (Dyar). Mr. Grossbeck records finding adults in swarm in a hollow tree VII, 24. Larvæ in early spring under hemlock chips on which they fed and developed.
- E. denticulalis** Harv. Elizabeth VII (Bz); Roselle VII, 15 from the Kemp collection; Paterson VIII, 15 (Gr).
- E. rotundalis** Wlk. Forest Hill VII (Wdt); Elizabeth VII (Bz); Lakehurst IX, 14 (div); 5-mile beach VIII, 27 (Haim).
- E. forbesii** French. Resembles the preceding closely and is probably confused with it in collections.
- E. scobialis** Grt. Near Newark and in eastern N. J. generally.
- E. americalis** Gn. Throughout the State VII-IX. I have it from Lake Hopatcong and Anglesea, and it is recorded from numerous intervening points. Larva on "Hedysarum," sweet-clover, etc. (Bt), and has also been bred from larvæ found in ants' nests.
- E. æmula** Hbn. Locally common throughout the State VI-IX. The larva is said to feed on spruce and also on dead leaves.
- E. julialis** Sm. Oak Ridge (Shoemaker).

Sub-family HERMINIINÆ.

ZANCLOGNATHA Led.

- Z. lituralis** Hbn. Lake Hopatcong VII, 5, New Brunswick VII, rare, at light (Coll); Orange Mts. VII (Wdt); 5-mile beach VIII, 14 (Haim).
- Z. theralis** Wlk. 5-mile beach VII, 9 (Haim).
- Z. lævigata** Grt. Delaware Water Gap VII, 1 (Jn) 15 (Coll); Lake Ho-

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patcong VII, 20 (Gr); Staten Island VII (Ds), probably local in the northern sections.

- Z. pedipilalis** Gn. Passaic Co. VI, 2 (Coll); Elizabeth and Newark V, VI (Bz).
- Z. cruralis** Gn. Boonton VIII, IX, Orange Mts. VI (Wdt); Paterson V, 12, VIII, 17 (Gr); Staten Island VIII (Ds); Newark VIII (Bwl); Elizabeth VII, VIII (div).
- Z. obscuripennis** Grt. "New Jersey" specimens are in collections without definite locality or date.
- Z. protummosalis** Wlk. Elizabeth VII, VIII (Bz); New Brunswick, and probably throughout the State, rarely.
- Z. marcidilinea** Grt. Greenwood Lake; Newark, at light VIII (Wdt); Merchantville VI, 29 (Kp).
- Z. ochreipennis** Grt. Lake Hopatcong VII, 5 (Coll); So. Orange VIII (Bwl); Newark VIII, IX (Wdt); Elizabeth VII, VIII, 19 (div), and probably throughout the State.

HORMISA Wlk.

- H. absorptalis** Wlk. Paterson VI, 15, Montclair, New Brunswick at light VII, Anglesea IX, 4 (Coll); Newark VII (Wdt); Elizabeth VI, VII, 24 (div); Westville (Lt); 5-mile beach VIII, 2, IX, 4 (Haim).
- H. litophora** Grt. Staten Island VII (Ds); Elizabeth VII, 19, 24 (div); Forest Hill VII (Wdt); New Brunswick VII, 6 (Coll).
- H. orciferalis** Wlk. Elizabeth VI, 5, 1 specimen (Bz); Anglesea at light VI, VIII, IX (Coll), and also taken VIII, 2-13 at Holly Beach (Haim).

PHILOMETRA Grt.

- P. metonalis** Wlk. Staten Island VI (Ds); New Brunswick VII, 3 (Gr); Sussex Co. VIII, 15, Chester VIII, 17, Elizabeth VI, VIII, 6 (Coll).
- P. eumelusalis** Wlk. Chester VIII, 17 (Dn); Jersey City IX (Sb); Elizabeth VIII, 9 (Bz); New Brunswick VI, 16 (Coll); 5-mile beach VI, 19-31 (Haim), and probably throughout the State; the larva feeding on the roots of grasses.

CHYTOLITA Grt.

- C. morbidalis** Gn. Throughout the State V-VIII, in deciduous woods, more or less commonly.
- C. petrealis** Grt. Found with the preceding, but rarely.

BLEPTINA Gn.

- B. caradrinalis** Gn. Throughout the State, May to September, local and sometimes rather common; attracted to light.
- B. inferior** Grt. Anglesea IX, 12, Burleigh (Sm); a southern species which has not been taken by collectors generally.

TETANOLITA Grt.

- T. mynesalis** Wlk. Anglesea, not uncommon at light VI, 10, VIII, 2, IX, 4.
T. floridana Sm. Paterson VII, 29 (Gr); Orange Mts. VIII, 16 (div);
 Elizabeth VIII (Bz); 5-mile beach VII, 26 (Haim).

RENIA. Gn.

- R. salusalis** Wlk. Staten Island VII (Ds); Elizabeth IX, 1 (Kp); Monmouth Co. VII, 3 (Coll); Westville VII, 2 (Lt), and probably local throughout the State.
R. discoloralis Gn. Orange Mts. VII, VIII (Wdt); Newark VIII (Bwl); Staten Island VII, VIII (Ds); 5-mile beach VII (Haim).
R. sobrialis Wlk. Staten Island VII, and I have seen New Jersey specimens also.
R. larvalis Grt. Staten Island VII (Ds); Forest Hill VII (Wdt); Elizabeth IX, 9 (Kp); common near New York (Bt).
R. clitosalis Wlk. Forest Hill VII (Wdt); Elizabeth IX, 9 (Kp); 5-mile beach VIII, 6 (Haim); New Brunswick VII, 28; Jamesburg (Coll).
R. factiosalis Wlk. Elizabeth VII-IX, 2 (Bz); Staten Island VIII (Ds); Jamesburg VII (Coll); 5-mile beach VIII, 12 (Haim).
R. tilosalis Sm. Chester VIII, 28, Jamesburg (Coll).
R. flavipunctalis Geyer. Paterson to Anglesea VII & VIII and probably throughout the State; the most common of the species of the genus.
R. atrimacula Sm. Sussex Co. VIII, 13 (Kemp).
R. fraternalis Sm. Newark (Bz and Coll).

HYPENULA Grt.

- H. cacuminalis** Wlk. Cumberland County, 1 specimen only.

HETEROGRAMMA Gn.

- H. pyramusalis** Wlk. Chester VIII, 17, Newark V, 30 (Coll); Staten Island V, VII, VIII (Ds); Jersey City IX (Sb); Elizabeth VII, VIII, 4 (div); 5-mile beach VII, 29 (Haim); probably throughout the State.

GABERASA Wlk.

- G. ambigualis** Wlk. Staten Island V, VIII, IX (Ds); Newark IV, V (div); Elizabeth V, 12-VIII, 22 (div); 5-mile beach VIII, 22 (Kp).

DERCETIS Grt.

- D. vitrea** Grt. Woodside VI, 17 (Bwl).

PALTHIS Hbn.

- P. angualis** Hbn. Andover VI (Kr); Paterson V, 30, VIII, 13 (Gr); Staten Island V-IX (Ds); 5-mile beach VII, 26 (Haim). Occurs throughout the State.
P. asopialis Gn. Occurs with the preceding, but is not so abundant.

Sub-family HYPENINÆ.

CAPIS Grt.

- C. curvata* Grt. Occurs very rarely in the northern parts of the State.

SALIA Hbn.

- S. interpuncta* Grt. Hopatcong (Pm).

BOMOLOCHA Hbn.

- B. manalis* Wlk. Hopatcong (Pm); Sussex Co. VIII 14, Elizabeth VII, 8 (Coll), VI, IX (Bz); Newark VI-IX (div); Staten Island VI (Ds).
B. baltimoralis Gn. Paterson V, 11, VII, 6-20, VIII, 6 (Gr); Staten Island IV-VII (Ds); Newark VI-VIII (div); Elizabeth V, VII, 20, IX, 5 (div); New Brunswick V, VI (Coll); occurs throughout the State without doubt; the larva reported on maple.
B. bijugalis Wlk. Anglesea (Lt), and probably local throughout the State.
B. scutellaris Grt. Hopatcong (Pm), Newark at light VIII (Wdt).
B. abalinealis Wlk. Paterson VI, 9 (Gr); Elizabeth, Newark, VI (Bz); Staten Island V, VIII (Ds); larva on elm (Dyar).
B. deceptalis Wlk. Sure to occur; found near New York City (Bt).
B. madefactalis Gn. Chester (Dn); Paterson V, 10 (Gr); Hopatcong (Pm); Hemlock Falls V, 7 (Bz); rare near New York City (Bt).
B. sordidula Grt. Newark VI (Bz); Forest Hill VII, rare (Wdt); Union Co. VI, 3 (Coll).
B. toreuta Grt. New Brunswick, at light, VII (Coll).
B. edictalis Wlk. Hopatcong (Pm).
B. citata Grt. Newark, at light X, 11 (div); New Brunswick VII (Coll).

LOMANALTES Grt.

- L. eductalis* Wlk. Bloomfield VIII, 14 (Kp); occasional throughout the State.

PLATHYPENA Grt.

- P. scabra* Fab. Common throughout the State from May to November, and Mr. Broadwell records a specimen under bark at Boonton, Dec. 24. It is the commonest species of this entire family, and the larva feeds chiefly on clover.

HYPENA Schranck.

- H. humuli* Harr. Occurs throughout the State and recorded as common at Caldwell by Mr. Crane. The only dated specimen that I have came from Newark IV, 25. The larva feeds on hop and is a semi-looper.

Family THYATIRIDÆ.

Medium or rather large moths with soft gray and pink velvety colors, resembling the owlets in appearance, the anal angle of the fore-wings often produced into a tooth or lappet. The family is a small one, and we have only a very few species.

EUTHYATIRA Smith.

E. pudens Gn. A New Jersey specimen is in the Hulst collection. The larva in spun-up leaves of dogwood, "C. florida" (Dyar).

PSEUDOTHYATIRA Grt.

P. cymatophoroides Gn. Piedmont Plain and northward VI-VIII; the larva on birch (Dyar), maple and oak, looks like a Notodontian.

var. **expultrix** Grt. Occurs with the type and is more common.

THYATIRA Ochs.

T. scripta Gosse. Bayonne (Bt); Hopatcong (Pm); the larva on blackberry and raspberry; nowhere common.

T. rectangula Ottol. New Brunswick VI, 7 (Gr), and probably throughout the northern part of the State.

Family NOTODONTIDÆ.

Moderately sized moths with somewhat retracted head, short palpi, rather short antennæ and often short, useless tongue. The thorax is comparatively short, quadrate, while the abdomen is usually long, cylindrical and obtusely terminated. The legs are moderate in length or short. The wings are long and not very broad, the inner margin often produced into a tooth, lobe or similar process. The larvæ are naked or have only sparse hair; but often have spines, spurs, humps and other prominences. Sometimes the anal legs are modified into slender processes resembling a long fork. Most of them are solitary and live exposed, feeding on the foliage of trees and shrubs; but some live in large colonies consisting of the members of one batch of eggs. A few live in webs or small tents.

Several of the species are injurious; but practically all of these are within reach of arsenical sprays.

APATELODES Pack.

A. torrefacta S. & A. Generally distributed north of the Piedmont Plain; adults V-VIII; larvæ on oak, wild cherry, blackberry, sassafras, hazel and many others, VIII & IX.

A. angelica Grt. Hopatcong (Pm); Paterson (Gr); Ft. Lee (Wrms); Plainfield (Bz); adults V, VI, VII; larva on ash and lilac VIII, IX.

MELALOPHA Hbn.

- M. albosigma* Fitch. Hopatcong (Bt); Newark VI (Sb); throughout northern New Jersey VI-VIII; larva solitary on willow and poplar.
- M. brucei* Hy. Edw. Passaic VI, 18 (Wrms).
- M. apicalis* Wlk. Hopatcong (Pm); 5-mile beach (Haim); common along the Hudson River Valley (Dyar), and local throughout the State; larva solitary on willow and poplar.
- M. inclusa* Hbn. More or less abundant throughout the State; adults V-VII and VIII-X; larva gregarious on willow and poplar.

DATANA Wlk.

- D. angusii* G. & R. Hopatcong (Pm); Newark (Soc); Staten Island VI,



Fig. 198.—Yellow-necked caterpillar, *Datana ministra*: *a*, larva; *b*, moth; *c*, eggs; *d*, single egg, enlarged.

- VII (Ds); New Brunswick (Coll); Freehold (U S Ag); locally common; larva on hickory, witch-hazel, huckleberry, etc.
- D. ministra* Dru. Throughout the State VI & VII. The larva is the common yellow-necked caterpillar of the apple, which sometimes defoliates nursery and even orchard trees. It feeds also on a great variety of other fruit, forest and shade trees.
- D. drexelii* Hy. Edw. Paterson VII, VIII (Gr); Caldwell VII (Bz); 5-mile beach VIII (Haim), and at numerous intervening localities; larva on huckleberry, witch-hazel and linden.
- D. major* G. & R. Paterson VI, 23 (Gr); Newark VI (Soc); Staten Island VI, VII (Ds); New Brunswick VI (Coll); larva on witch-hazel, sumac, "Andromeda."
- D. palmii* Beut. Del. Water Gap (Pm); Hopatcong, larva VII, 4, pupa 10-15, adults VIII (Dow); larva on huckleberry.
- D. perspicua* G. & R. Throughout the State VI-VIII; larva sometimes abundant on sumac VIII, IX.
- D. integerrima* G. & R. Throughout the State VI-VIII; the black larvæ on hickory and walnut, often in great numbers. They are covered

with fine white hair and often group themselves in large numbers on the trunk when nearly full grown. All the species of this genus feed in company, and hence are conspicuous even if not really harmful.

- D. contracta** Wlk. Throughout the State VI, VII; the larva locally common on oak, chestnut and, more rarely, hickory.

HYPERÆSCHRA Butl. (NOTODONTA Ochs.)

- H. stragula** Grt. Piedmont Plain and northward; adults V, VI and again, the second brood, VII, VIII; larva on willow and poplar.
H. georgica H. S. Hopatcong (Bt); Newark VIII (Sb); double-brooded, larva on oaks (Dyar) and wild cherry (Sb).

ODONTOSIA Hbn.

- O. elegans** Streck. Hopatcong (Pm); Newark (Coll).

LOPHOPTERYX Steph.

- L. americana** Harv. (capucina L.) "New Jersey" (Blake, Packard).

NOTODONTA Ochs.

- N. basitriens** Wlk. "New Jersey" (Packard "fide" Palm).

PHEOSIA Hbn.

- P. dimidiata** H. S. Hopatcong (Pm); Paterson VII, 28 (Gr); Newark (Soc); Ocean Co. (Sm); larva on poplar IX (Gr).

LOPHODONTA Pack.

- L. ferruginea** Pack. Hopatcong (Bt); Newark (div); Staten Island (Ds). Two brooded; adults V-VI, VII-VIII; larva on paper birch.
L. angulosa S. & A. Hopatcong (Bt); Paterson (Gr); Newark (div); Elizabeth (Bz); Staten Island (Ds); adults VI-VIII; larva on red oak (Dyar) VIII-X.

NADATA Wlk.

- N. gibbosa** S. & A. Throughout the State. Double brooded; adults V-VI, VII-VIII; larva on oak, maple, white birch and plum.
 var. **doubledayi** Pack. Occurs with the type, but more rarely.

NERICE Wlk.

- N. bidentata** Wlk. Throughout the State, locally not rare: larva on elm.

SYMMERISTA Hbn.

S. albifrons S. & A. Throughout the State; larva gregarious and sometimes very abundant on oak. Acres of scrub land are sometimes almost completely defoliated, but the insect is rarely abundant two seasons in succession.



Fig. 199.—*Symmerista albifrons* and its larva.

DASYLOPHIA Pack.

D. anguina S. & A. Throughout the State VI-VIII, nowhere common; larva on locust, false indigo, clover, etc.

D. thyatiroides Wlk. Near New York (Bt); Jamesburg (Sm); very rare everywhere; larva on hickory.

HETEROCAMPA Doub.

H. astarte Doub. One larva beaten from oak, Lakewood VIII, 26 (Gr).

H. obliqua Pack. Hopatcong VI, VII (Bt); Newark VII, 20 (Sb); Elizabeth VII (Bz); larva on oak, "*Q. macrocarpa*" (Dyar).

var. *trouvelotii* Pack. Occurs with the type.

H. umbrata Wlk. Caldwell (Cr); Newark (Ang); near New York (Bt); Staten Island VI (Ds); adults V, VI, VIII, not common; larva on oak, "*Q. tinctoria*" (Dyar).

H. pulverea G. & R. 5-mile beach V, 27 (Haim).

H. manteo Doub. Staten Island VII, VIII (Ds); Newark (Soc); Elizabeth VII (Bz); larva on apple, oak, basswood, persimmon, walnut, etc.

H. biundata Wlk. Throughout the State V and VIII, not common; larva on a great variety of forest, shade and orchard trees.

H. guttivitta Wlk. Newark, Elizabeth, Staten Island VI, VIII; not common near New York (Bt); larva on maple, oak, chestnut, beech, etc.

H. bilineata Pack. Throughout the State V-VIII, larva until X. Feeds chiefly on elm, not infrequently on city shade trees, but is also found on beech.

MISOGADA Wlk.

M. unicolor Pack. Caldwell (Cr); Newark (Soc); Staten Island (Ds); adults V-VIII; larva on maple and sycamore; not common.

JANASSA Wlk.

J. lignicolor Wlk. Throughout the State, not rare, V-VII; larva on oak, beech and white birch.

SCHIZURA Doubl.

S. ipomœæ Doubl. Throughout the State VI-VIII, the larva until IX & X, sometimes not rare; feeds on maple, oak, birch, blackberry, huckleberry, &c.

The varieties "telifer" Grt. and "cinereofrons" Pack. occur with the type, but are less abundant.

S. concinna S. & A. Throughout the State, sometimes common, V, VI & VIII. The larva in colonies on a great variety of plants, including most of our orchard and small fruits.

S. semirufescens Wlk. (*eximia* Grt.) Morris Plains (Edw); Hasbrouck Hts. VIII, 3, Ft. Lee VI, 14 (Wrms); Staten Island VI (Ds); larva on apple, willow, maple and other trees; not common.

S. unicornis S. & A. Throughout the State, often common V, VI. The larva on most orchard, many shade and forest trees and some shrubby plants.

S. apicalis G. & R. Newark (Soc); very rare near New York (Bt).

S. badia Pack. Hopatcong (Bt); Morris Plains (Edw); Newark (Ang); Staten Island VI (Ds).

S. leptinoides Grt. Morris Plains (Neum); Patterson VI, New Brunswick VIII (Gr); Newark (Ang); Elizabeth VII (Bz); Woodbury VI, 8 (Kp); larva on oak, hornbeam, beech, hickory, butternut, &c.

HYPARPAX Hbn.

H. aurora S. & A. Newark VI-IX (div); Paterson VIII, New Brunswick VIII (Gr); Guttenberg VI, Ft. Lee VII (Wrms); Staten Island VI (Ds); Woodbury VI (Kp); larva on oak and white birch, not common.

CERURA Schranck.

C. scitisscripta Wlk., var. *multiscripta* Riley. Hopatcong (Pm.); Paterson (Gr); Newark V, VI (Wdt); larva VIII on willow and poplar. The larvæ in this and the next following genus, which is now used for some of the species of this type, all have the anal legs produced so as to form a long, slender fork.

C. occidentalis Lint. Newark V, VI, Staten Island VII (Ds); two brooded, larva on willow and poplar VI, VII and VIII, IX.

HARPYIA Ochs.

H. borealis Bdv. Throughout the State, not rare. Adults V, VI and again VII, VIII; larva on wild cherry and allied plants.

H. cinerea Wlk. Hopatcong (Pm); Plainfield V (Gr); Staten Island VI, VIII (Ds), and almost certainly throughout the State. Double brooded; the larva on willow and poplar.

FENTONIA Butl. (MACRUROCAMPA Dyar.)

F. marthesia Cram. Hopatcong (Pm); Paterson IX, 11, larva (Gr); Newark VII (div); Staten Island VII (Ds); feeds on oak, beech, chestnut, hickory.

GLUPHISIA Bdv.

- G. septentrionalis* Wlk. Hopatcong (Pm); Ft. Lee V-VIII (Bt); Woodside VI, 4 (Bwl); larva on willow, poplar, yellow birch, sweet gum.
G. severa Hy. Edw. (*Eumelia*) Ft. Lee (Bt, Dyar); larva on poplar.

ELLIDA Grt.

- E. caniplaga* Wlk. Montclair, electric light VI, 8 (Kf).

Family LIPARIDÆ.

These are the "tussock moths"; sombre gray or brown species of moderate size, with broad wings, broadly pectinated antennæ in the male, and long hairy fore-legs, which when at rest are stretched out forward. In the genera "*Notolophus*" and "*Hemerocampa*," the latter of which is now used for our species previously referred to "*Notolophus*," the females are wingless. The caterpillars are brightly colored and have truncated dorsal tufts or brushes of hair and long pencils at or near the extremities.

HEMEROCAMPA Dyar.

- H. definitiva* Pack. Lake Hopatcong (Pm); Millburn—eggs only (Gr); Ft. Lee (Bt); and undoubtedly occurs throughout the northern part of the State. The larva is quite a general feeder.
H. leucostigma S. & A. The "vaper" or "White-marked Tussock Moth." Occurs throughout the State in cities, towns and villages, and is the most common of the caterpillar pests of shade trees. It is rarely found in woodland or away from settlements, and it seems to be abundant and troublesome in proportion to the dominance of the sparrows, which do not eat the larvæ and prevent the existence of birds which might do so. The female is wingless, and when she emerges from the pupa crawls on her cocoon and lays a mass of whitish eggs, which are then covered with a snow white, frothy mass that becomes hard and brittle after a brief exposure to the air. There are two broods in the southern half of the State and only one in the north. In Newark there is a partial second brood only. In any case the eggs winter unhatched, and as they are conspicuous, gathering and destroying is a good way of checking the species on small trees. The young larvæ succumb readily to the arsenites; but the older caterpillars are quite resistant.

OLENE Hbn.

- O. achatina* S. & A. Near Newark in July; larvæ on the usual orchard trees and also on oak, hickory, chestnut and other forest trees.
O. tephra Hbn. (*parallela* G. & R.) Hopatcong (Pm); Greenwood Lake, Ft. Lee (Bt); Jersey City, Newark (div). Larva on apple, plum, oak, walnut, chestnut and other forest trees.
O. plagiata Wlk. (*clintonii* G. & R.) Hopatcong (Pm); Greenwood Lake (Dyar); Morris Plains (Bt); Newark. Larva on persimmon, oak, hickory.

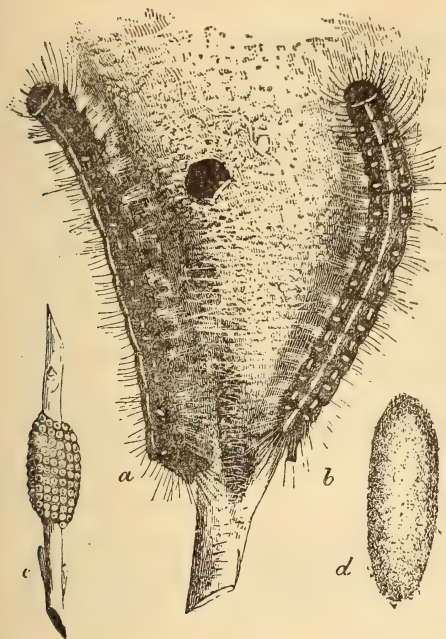


Fig. 202.



Fig. 203.



Fig. 204.

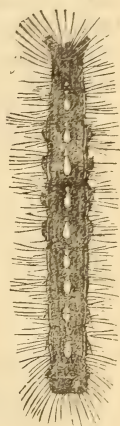


Fig. 200.

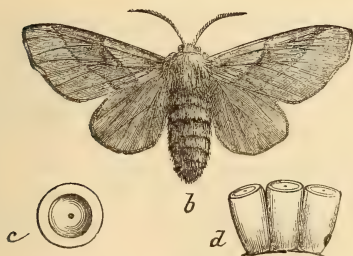


Fig. 201.

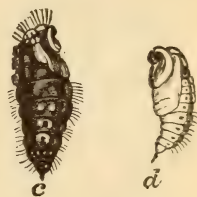


Fig. 207.

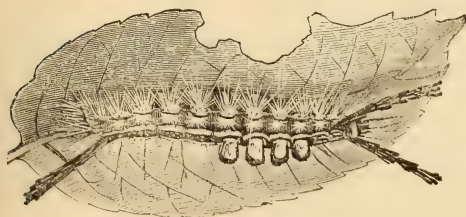


Fig. 205.

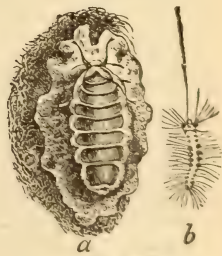


Fig. 206.

- Fig. 200.—Forest tent caterpillar, *Malacosma disstria*.
 Fig. 201.—*Malacosoma disstria*: b, female moth; c, single egg from above; d, eggs from side; c and d enlarged.
 Fig. 202.—Orchard tent-caterpillar: showing larva, base of tent, cocoon and egg mass.
 Fig. 203.—*Malacosoma americana*, female.
 Fig. 204.—White marked Tussock moth, *Hemerocampa leucostigma*, male.
 Fig. 205.—Larva of white marked Tussock moth.
 Fig. 206.—White marked Tussock moth; a, female on its egg mass; b, young caterpillar suspended on thread.
 Fig. 207.—White marked Tussock moth pupæ; d, male, c, female.

Family LASIOCAMPIDÆ.

Stoutly built, rather shaggy moths of medium size, with pectinated antennæ, small retracted head, slender palpi and short tongue. The wings are rather short and broad, very densely clothed, usually with pale or darker median lines. The larvæ are "lappet" or "tent" caterpillars, and some of the latter are of economic importance.

The lappet-caterpillars are so called because they are much flattened and have along the sides fringed processes which, when at rest, are so closely applied to the surface upon which they lie that the insect becomes practically invisible. None of these ever occur in harmful numbers. The "tent-caterpillars" live in great colonies, and sometimes defoliate entire trees or even large stretches of forest or orchard. In this family the terms "Phyllodesma" and "Clisiocampa" used in the last edition are replaced by "Epicnaptera" and "Malacosoma," respectively.

ARTACE Wlk.

A. punctistriga Wlk. Elizabeth V, VI, XI, 6 (Bz); X, 8 (Kp); Newark (Soc); Freehold (U S Ag); Delair X, 6 (Dke); rare. The larva feeds on oak.

TOLYPE Hbn.

- T. velleda** Stoll. Occurs throughout the State, rarely; adults in September and October. Mr. Grossbeck reports eggs at Plainfield V, 16, larvæ V, 18-IX, 16, therefore growing very slowly. Pupæ are reported as early as VII, 15, 26 at Woodridge, by Wormsbacher. Larva feeds on apple, pear, cherry, maple, oak, elm, willow, lilac, etc.
- T. laricis** Fitch. Woodridge IX, 10 (Wrms); near New York (Bt); Newark, at light (Ang). The larva occurs rarely on pine, larch and hemlock, and will probably be found throughout at least North Jersey.

MALACOSOMA Hbn.

- M. disstria** Hbn. The "forest tent caterpillar," so called, although it really makes no tent. Occurs throughout the State, rarely in orchards, more commonly on forest trees; yet never abundant enough, in my experience to cause trouble. More common in North Jersey, and in New York State has been very destructive. The moths come in June and July, lay their eggs in a belt around small twigs, but do not cover them with a frothy varnish.
- M. americana** Fabr. The common "tent caterpillar," which occurs on orchard and some other trees in early spring. The eggs are laid in July in a belt around small twigs, covered with a frothy varnish, and so pass the winter. The larvæ hatch as the buds open or even before, and form a nest or web in a crotch or fork. This web increases in size as the colony develops and the larvæ feed at night

on the surrounding foliage. Nests may be destroyed when young or the space around them may be sprayed with arsenites. Cutting out the egg masses in winter is practical in small orchards of young trees.

EPICNAPTERA Ram.

- E. americana* Harr. Occurs throughout the State, rarely, April to July. Plainfield VI, 18 (Gr); Brown's Mills IV, 29 (Dke). The larva feeds on apple, cherry, maple, birch, poplar and other trees.

Family DREPANIDÆ.

Moderate sized, slender, broad-winged species, the fore-wings usually falcate, giving them the common name "hook-tips." The larvæ have the anal pro-legs rudimentary and the terminal segment prolonged into a tail-like process.

EUDEILINEA Pack.

- E. herminiata* Gn. Staten Island V & VIII (Ds); larva on dogwood (Dyar).

ORETA Wlk.

- O. rosea* Wlk. Hopatcong (div); Paterson VIII, 23 (Gr); Eagle Rock VIII (Wdt); Newark (Soc); Elizabeth IX, 10 (Bz); Staten Island V, VII, VIII (Ds); larva on "Viburnum Sp.," never common.
- O. irrorata* Pack. New Brunswick VI, 4 (Gr).

DREPANA Schrank. (PLATYPTERYX Lasp.)

- D. arcuata* Wlk. Hopatcong (Pm); Paterson VI, 23, New Brunswick VIII, 20 (Gr); Orange Mts. V (Wdt); Newark VIII (div); Staten Island VIII, IX (Ds). Two-brooded, the first in May and June; the second, in August and September, is the form "genicula" Grt., which sometimes strongly resembles the Californian "siculifer" Pack. The larva feeds in a tent, solitary, on birch and alder.

FALCARIA Haw.

- F. bilineata* Pack. Hopatcong (Pm); Staten Island VII, VIII (Ds); the larva on birch; not common.

Super-family GEOMETROIDEA.

These are small or medium sized moths, with slender bodies, small heads and very broad wings, which are also, as a rule, frail and thin. The hind wings quite usually have ornamentation similar to those on

the fore-wings, and the lines are often continuous on both. At rest most of the species keep the wings extended and flat, as if set for the cabinet.

The larvæ are known as "loopers," "span-worms," "inch-worms" or "measuring-worms," because of their peculiar mode of progression. The abdominal legs are in whole or in part obsolete, and the caterpillar when in motion first extends the body full length, then humps itself in the middle and brings the anal segments up to the thoracic feet. When the body is again extended the insect has progressed nearly its own length. These caterpillars often so closely resemble the twigs among which they move that they are seen with difficulty only, and some have the habit of stretching out at full length so as to appear like a little spur or twig. Some species are injurious to cultivated plants; but all are within reach of the arsenites.

The list in this super-family has been prepared by Mr. John A. Grossbeck, who has made a special study of it, based upon the previous work and collections of the late Dr. George D. Hulst, whose results were followed in the last list. Such changes as have been made necessary by recent studies are indicated in the usual way.

Family GEOMETRIDÆ.

Sub-family HYDRIOMENINÆ.

DYSPTERIS Hbn.

- D. abortivaria* H. S. Paterson VII, 24, VIII, 3 (Gr); Caldwell (Cr); Chester VIII, 23 (Dn); Orange Mts. VIII (Wdt); Newark; Staten Island V (Ds); larva on grape.

NYCTOBIA Hulst.

- N. limitaria* Wlk. (*fusifasciata* Walk.) Paterson III, 29-V; 30 (Gr); Newark, Staten Island IV (Ds); New Brunswick (Coll); food plant "Amelanchier," Juneberry.
- N. anguilineata* Grt. Newfoundland IV, 28; Staten Island IV, 1, Lakehurst V, 4 (Ds).
- N. viridata* Pack. Orange Mts. (Kp).

CLADORA Hulst.

- C. atroliturata* Walk. Forest Hill, Hemlock Falls IV (Bz).

RACHELA Hulst.

- R. bruceata* Hulst. Plainfield XI, 22 (Coll); Staten Island XI, XII (Ds). This was listed in the previous catalog as "*Operophtera boreata*," an European species.

ALSOPHILA Hbn.

- A. pometaria** Peck. Elizabeth II, 22 (Bz); Staten Island XI and XII (Ds), and rarely throughout the State; the larva is the "fall canker worm" and feeds on oak, hickory, apple, linden, elm and other deciduous trees.



Fig. 208.—Fall canker worm, *Alsophila pometaria*: a, male moth; b, wingless female; c, d, structural details.

EUDULE Hbn.

- E. mendica** Walk. Throughout the State, V–VIII, more or less local and sometimes common; food plant, violets.

- E. meridiana** Sloss. Elizabeth VI, 4–24, VIII, 27 (Bz); Newark at light (Ang); Angelsea (Kp).

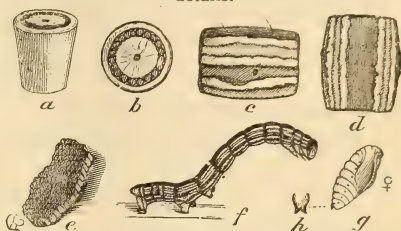


Fig. 209.—Fall canker worm: a, b, egg, enlarged, from side and above; c, d, body segments of larva enlarged; e, egg mass; f, larva; g, pupa; h, its tip, enlarged.

LOBOPHORA Curt. (PHILOPSIA Hulst.)

- L. nivigerata** Walk. Rare near New York (Bt); Elizabeth V, 15 (Bz).

NANNIA Hulst.

- N. refusata** Walk. Probably occurs in New Jersey.

HETEROPHLEPS H. S.

- H. triguttaria** H. S. Staten Island VI, VII (Ds); Forest Hill VII (Wdt); Paterson VIII, 8, New Brunswick VI, 16, Milltown VI, 10 (Gr); common in damp, wooded places. Larva on maple.

EUPITHECIA Curt. (TEPHROCLYSTIA Hbn.)

- E. miserulata** Grt. (*nebulosa* Hulst.) Newark VII, 12, 30, VIII, X, 27 (Bwl); New Brunswick VII, 12, 24, IX, 16 (Gr); Staten Island VII, VIII, larva on cultivated geranium (Ds).
- E. coagulata** Gn. Sussex Co. VIII, 15, 23 (Bwl).
- E. geminata** Pack. Basking Ridge VI, 18 (Bwl).
- E. fumosa** Hulst. Elizabeth VIII, 31 (Bz).
- E. russeliata** Swett. Newark IV, 6 (Bwl).
- E. fasciata** Taylor. "New Jersey" (Taylor fide Kf).
- E. indistincta** Taylor. Newark (Weidt).
- E. latipennis** Hulst. Sure to occur in New Jersey.
- E. borealis** Hulst. Occurs within our faunal range.

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E. swettii Gross. Found in adjacent States.

E. interruptofasciata Pack. Certain to be found in New Jersey.

All of these last four will almost certainly be found in the northern part of the State as well as a few other species. "*T. absynthiata*" is European and "*implicata*" has not been recorded south of the Hudson's Bay district.

EUCYMATOGE Hbn.

E. intestinata Gn. Hopatcong (Pm); Chester VIII, 8 (Dn); Newark, light VIII (Wdt), VI (Bz); Staten Island VIII (Ds).

VENUSIA Curt.

V. cambrica Curt. Should occur in New Jersey. "*V. duo-decimlineata*" Pack. of the last edition is based on an error.

EUCHŒCA Hbn.

E. inornata Hulst. Elizabeth VI, 4-VII, 4 (Bz); Staten Island V, VI (Ds).

E. comptaria Walk. Hemlock Falls IV, 22 (Bz); on beech and alder (Bt).

E. lucata Gn. Hopatcong (Pm); Elizabeth V, 20, VII, 10 (Bz).

E. albifera Walk. (*albogilvaria* Morr.) Sussex Co. VIII, 14 (Bwl); Passaic VI, 20 (Gr); Elizabeth VII, 22 (Bz); food plant, elm.

TRICHODEZIA Warr.

T. albovittata Gn. (*Euchoeca*) Lake Hopatcong VII, 21 (Pm, Gr); Newark VIII, 13 (Bwl); Milltown VII, 16 (Gr); Staten Island V-VIII (Ds), and throughout the hilly north.

HYDRIA Hbn. (CALOCALPE Hbn.)

C. undulata Linn. Paterson VII, 24 (Gr); Denville (Bwl); Chester VII, 19 (Dn); Orange Mts. VIII (Wdt); Elizabeth VI-VII (Bz); Staten Island V, VI (Ds). Larva gregarious in webbed-up leaves of wild cherry.

EUSTROMA Hbn.

E. diversilineata Hbn. Recorded from all parts of New Jersey VI, 25-IX, 15. The variety "*gracilineata*" Gn. occurs with the type but more rarely. Food, grape and "*Ampelopsis*."

E. testata Linn. Del. Water Gap VII, 14 (Jn); larva on birch, willow and bean.

E. atropurpurea Grt. Delaware Water Gap VII, 14 (Jn).

"*E. prunatum*" does not belong to our fauna.

RHEUMAPTERA Hbn. (PLEMYRIA Hbn.)

R. hastata Linn. Hopatcong (Pm); Paterson VII, 3; Orange Mts. VII, 4 (Gr); Newark VII, 16 (Bwl); Staten Island VI, VII (Ds); New Bruns-

wick VII, 1 (Coll); larva on birch, wax myrtle, willow, huckleberry and rhododendron.

"*Zenophleps lignicolorata*" does not occur in the east.

PERCNOPTILOTA Hulst.

P. fluviata Hbn. Common May to November throughout the State. Larva on elm, smartweed, "*Senecia*."

MESOLEUCA Hbn.

M. ruficiliata Gn. Hopatcong (Pm); Elizabeth VI (Bz); larva on birch.

M. aurata Pack. (*cæsiata* Bork.) Hopatcong (Pm).

M. lacustrata Gn. Recorded from all points north of the Delaware Valley region IV-VIII; larva on blackberry, birch, white-thorn and willow.

M. truncata Hbn. Common near New York; larva on strawberry (Bt).

M. hersiliata Gn. Near New York, not common (Bt); larva on currant.

M. vasaliata Gn. Paterson IV, 3 (Gr); Newark IV (Bwl); Forest Hill III, common on hemlock (Wdt); Staten Island IV (Ds); larva on thimbleberry, "*Rubus nutkanus*," and is also said to feed on wild rose.

M. intermediata Gn. Throughout the northern half of the State III-VIII; larva on jewel weed, "*Impatiens*."

HYDRIOMENA Hbn.

H. autumnalis Strom. (*trifasciata* Bork.) Newark VIII (Ang); Plainfield (Coll).

H. latirupta Walk. Throughout the State, IV-IX; larva on "*Polygonum*."

H. multifurcata Walk. Paterson VIII, 16 (Gr); Denville VI, 9, 20, Newark III, 9 (Bwl); Staten Island V, VI (Ds); Plainfield (Coll); larva on "*Polygonum*" and "*Epilobium*."

H. magnoliata Gn. (*Coenocalpe*) Sure to occur in the hilly north of New Jersey. Larva on fire-weed, "*Epilobium angustifolium*."

The records for "*H. unangulata*" were based on erroneous determinations.

COENOCALPE Hbn.

C. gibbicostata Walk. "New Jersey."

GYPSOCHROA Hbn.

G. designata Bork. Hopatcong (Pm); Chester VIII, 17 (Dn); Paterson VII, 13 (Gr); larva on "*Cruciferae*," wild and cultivated (Bt).

PETROPHORA Hbn. (*XANTHORHOE* Hbn.)

P. ferrugata Hbn. Chester VIII, 18 (Dn); Orange Mts. VIII (Wdt); Staten Island V, VII, VIII (Ds); larva on "*Polygonum*" and "*Nepeta hederacea*."

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- P. fluctuata** Linn. Boonton VIII (Wdt); Plainfield VI, 1 (Coll); Staten Island (Ds); larva on cabbage.
- P. munitata** Hbn. Should occur in New Jersey.

Sub-family MONOCTENINÆ.

HÆMATOPSIS Hbn.

- H. grataria** Fabr. Common throughout the State, May to October, much more abundant after mid-summer. The variety "annettearia" Haim. may occur in New Jersey.

Sub-family STERRHINÆ.

ERASTRIA Hbn. (CALOTHYSANIS Hbn.)

- E. amaturaria** Walk. Paterson VII, 27 (Gr); Caldwell (Cr); Newark VIII (Soc); Forest Hill (Wdt); Staten Island VII, VIII (Ds); New Brunswick VIII 28 (Gr); Camden IX, 14 (Kp); larva on "Polygonum dumetorum."

DEPTALIA Hulst.

- D. insularia** Gn. Throughout the State VI-X; common; larva on "Celastrus scandens," "Galium," "Cassia" and oak.

COSYMBIA Hbn. (LEUCOPHTHALMIA Hbn.)

- C. myrtaria** Gn. Paterson VIII, 10 (Gr); Newark V, 28 (Bwl); Anglesea (Lt); larva on sweet fern and huckleberry.
- C. lumenaria** Hbn. Throughout the State IV-VIII; larva on sweet fern, birch and "Vaccinium."
- C. pannaria** Gn. Clementon V, 10 (Kp).
- C. culicaria** Gn. Brown's Mills VI, 17 (Haim); Lakehurst (Watson).

SYNELYS Hulst.

- S. enucleata** Gn. (alabastraria Hbn.) Common throughout the State, VI, VII, VIII; larva on huckleberry, "Rhexia lutea" and "Galium." The varieties "relevata" Swett, and "adornata" Prout, occur with the type.
- S. nigrocandida** Hulst. Manahawkin VI, 14, Lakehurst VIII, 17 (Gr).

CINGLIS Gn.

- C. similaria** Walk. (quadrilineata Pack.) Hopatcong (Pm); rare near New York (Bt).
- C. purata** Gn. Basking Ridge VI, 8 (Bwl); Newark, Elizabeth VI, VII (Bz).

LEPTOMERIS Hbn.

L. inductata Gn. Common throughout the State, VI, VII and VIII.

EOIS Hbn.

E. peralbata Pack. Anglesea (Lt).

E. rufescens Hulst. Lacy VII, 14 (Dke).

E. ossularia Hbn. Newark VIII, 23 (Bwl); Elizabeth VII-IX (Bz); New Brunswick IX, 18, Jamesburg VIII, 10, Riverton V, 30 (Sm); Mt. Holly VII, 18 (Gr); Anglesea V, VII, IX (div).

E. granitata Pack. "New Jersey"; Plainfield VI, 1 (Coll).

E. obfusaria Walk. Caldwell (Cr).

E. nimbicolor Hulst. Brookville VII, Lakehurst VII (Ds).

E. pallida Hulst. Middlesex Co. (Sm).

Sub-family GEOMETRINÆ.

CHLOROCHLAMYS Hulst.

C. chloroleucaria Gn. Common throughout the State V-IX; larva on flowers of black and raspberry and "Helenium autumnale."

NEMORIA Hbn.

N. pistaceata Gn. Caldwell (Cr); Newark VI, 13 (Bwl).

N. subcroceata Walk. Caldwell (Cr); Chester VII (Dn); Orange Mts. VI, 22 (Gr); Newark VI, VII (Soc); Staten Island VI, VII (Ds); Elizabeth VII, IX, 5 (div); Jamesburg VII, 4 (Lt); Lahaway VI (Sm); Lakehurst V, 18 (Gr).

N. dyari Hulst. Lakehurst V, 18 (Gr). This may be the male of "subcroceata."

EUCROSTIS Hbn.

E. incertata Walk. Jamesburg VII, 4 (Lt); Lahaway VI (Coll).

RACHEOSPILA Gn.

R. lixaria Gn. Lake Hopatcong (Pm); feeds on "Myrica."

SYNCHLORA Gn.

S. ærata Fabr. (glaucaria Gn.) Hopatcong (Pm); Newark (Coll); Staten Island VI-VIII (Ds); Westville VII, 20 (Lt); New Brunswick VII, 19, IX, 12; Anglesea VII, 9, VIII, 2 (Gr); larva on black and raspberry.

APLODES Gn.

A. mimosaria Gn. Paterson V, 14 (Gr); Caldwell (Cr); Newark V, IX (Soc); Staten Island V, VI (Ds).

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- A. rubrifrontaria* Pack. Newark V-VII (Wdt); Elizabeth VII, 12 (Bz); Staten Island VII (Ds); Orange Mts. V, 24 (Gr).
A. bistriaria Hbn. Passaic Co. V, 1 (Bwl); Lakehurst IV (Ds).

ANAPLODES Gn.

- A. iridaria* Gn. (*remotaria* Wlk.) Chester VII, 23 (Dn); Staten Island V-VII (Ds); Bayonne (Wrms); larva on sumac.
A. rubromarginaria Pack. Newark; larva on wax myrtle.

Sub-family ENNOMINÆ.

EPELIS Hulst.

- E. truncataria* Walk. Clementon IV, 10, V, 9 (div); Lakehurst, V, 18, 24 (div); larva on bearberry "*Arctostaphylus uva-ursi*."

EUFIDONIA Pack.

- E. notataria* Walk. "New Jersey"; food plants, tamarack, hemlock, white pine. The variety "*fidoniata*" Walk. occurs with the type and will also be found in New Jersey.

ORTHOFIDONIA Pack.

- O. semiclarata* Walk. New Jersey, probably.
O. vestaliata Gn. Caldwell (Cr); Newark (Sb); Staten Island VII, VIII (Ds); Ocean Co. VI, 10 (Coll); larva on apple, hornbeam and oak.

HELIOMATA Grt.

- H. cycladata* Grt. Hasbrouck Heights VI, 10 (Wrms); Orange Mts. VI (Wdt); Plainfield VI (Bz); Staten Island VI (Ds).
H. infulata Grt. Rare near New York (Bt).

PHYSOSTEGANIA Warr.

- P. pustularia* Gn. Springdale VII, 16 (Gr); Hopatcong (Pm); Caldwell (Cr); Newark (Soc); Elizabeth VII (Bz); Staten Island V-VIII (Ds); Lahaway VIII, 1 (Coll); larva on maple and cranberry.

GUENERIA Pack.

- G. basiararia* Walk. Lake Hopatcong VII, 6, Paterson VI, 15 (Gr); Newark VI (Bwl); Elizabeth VI, VII, 20 (div); Milltown VI, 10 (Gr).

DEILINEA Hbn.

- D. variolaria* Gn. Hopatcong (Pm); Bloomfield VI (Bwl); Newark VI (Wdt); Elizabeth VII, 29 (Bz); larva on willow.
D. erythremaria Gn. Hopatcong (Pm); Orange Mts. VI (Wdt); Elizabeth VIII, 16 (Kp).

D. liberaria Walk. Newark VIII, IX, 17 (div); Staten Island IX (Ds).

"D. exanthemata" is not American, and the record for "D. (Anthelia) nigroseriata" was based on an error.

SCIAGRAPHIA Hulst.

S. granitata Gn. Forest Hill V, VIII (Wdt); Camden IV, 25 (Kp); Plainfield VI, 1, Paterson V, 18 (Gr); Jamesburg VII, Lakehurst IX (Ds).

S. heliothidata Gn. Elizabeth VII, VIII (Bz); Staten Island V, VII, VIII (Ds); larva on locust.

S. continuata Walk. Orange Mts. VIII (Wdt); Paterson V, 8, VI, 9, VII, 9, IX, 1 (Gr); Anglesea VI, IX, 4; pupæ beaten from juniper.

S. mellistrigata Grt. Newark (Ang); Anglesea (Lt).

"S. muscariata," "nubiculata," "neptata" and "subminiata" do not occur in New Jersey.

PHILOBIA Dup.

P. enotata Gn. Staten Island V, VI, VIII (Ds); Orange Mts. VI, 8 (Wdt); Jamesburg VII, 4 (Lt); Long Branch VII (Gr); Clementon V, 10 (Kp); larva on "Lactuca grandiflora."

MACARIA Curt.

M. infimata Gn. Forest Hill (Kp); Newark (Soc).

M. eremiata Gn. Clementon V, 10 (Lt); Middlesex Co., Lahaway VI, 10 (Coll); DaCosta V, 19 (Dke).

M. æquiferaria Walk. Hemlock Falls IV, 29 (Bz); Staten Island V (Ds).

M. minorata Pack. Plainfield (Gilbert).

M. præatomata Harv. Newark VII (Bwl); Forest Hill VIII (Wdt); Camden IV, 25 (Kp); larva on huckleberry.

CYMATOPHORA Hbn. (DIASTICTIS Hbn.)

C. distribuaria Hbn. Lakehurst IX (Ds).

C. ribearia Fitch. Hopatcong (Pm); Caldwell (Cr); Paterson VI, 18-VII, 27 (Gr); Newark (Soc), and probably throughout the State. The larva is the currant and gooseberry span-worm, and sometimes locally injurious. It is easily controlled by arsenical sprays.

C. sulphurea Pack. Should occur in New Jersey.

C. inceptaria Walk. Newark VI, IX (Wdt); Elizabeth VI, 12 (Bz); New Brunswick VI, 16, Milltown V, 30, VI, 12 (Gr); larva on oak.

C. subcessaria Walk. Orange Mts. VI (Wdt), also a currant span-worm, but never found in harmful numbers.

C. wavaría Linn. Staten Island VI (Ds); larva on currant and gooseberry.

C. virginalis Hulst. Newark (Coll).

The records for "C. flavicaria," "subalbaria," "umbrifasciata" and "inquinaria" have proved to be erroneous.

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HOMOCHLODES Hulst.

H. fritillaria Gn. Bloomfield VI and VII (Wdt).

APÆCASIA Hulst.

A. deterrenta Gn. Paterson VI, 10, 18 (Gr); Newark V, VI, VII (Soc); Orange Mts. V, VI (Bz); Staten Island V, VI (Ds).

A. defluata Walk. Paterson V, 10, VI, 15 (Cr); Newark V (Wdt); Hemlock Falls IV, V (Bz); Staten Island VI (Ds); Woodbury IX, 5 (Kp); Lahaway VI; larva on grass.

A. deductaria Walk. "New Jersey" (Coll).

A. extremaria Walk. Union Co. V, 1 (Bwl); Brown's Mills V, 13 (Dke); Clementon V, 7 (Haim).

CATOPYRRHA Hbn.

C. coloraria Fabr. Throughout the State IV-VII; larva on black and raspberry, and "Trifolium." The varieties "dissimilaria" Hbn. and "sphæromacaria" Harv. have also been taken.

CARIPETA Walk.

C. divisata Walk. Caldwell (Cr); Sparta VII (Ds); larva on hemlock.

C. angustiorata Walk. Clementon V, 30 (Harb); larva on white pine.

C. criminosa Swett. Will probably be found in the State.

NEPYTIA Hulst.

N. semiclusaria Walk. Paterson IX, 19, 26 (Gr); Newark IX (Bz); larva on fir, pine, spruce and tamarack.

ALCIS Curt.

A. multilineata Pack. New Jersey (Sachs); rare near New York (Bt).

A. atrolinaria Hulst. Newark IV, at light (Wdt); Staten Island IV (Ds).

A. guttata Hulst. New Jersey is within the faunal range of the species.

PARAPHIA Gn. (AMILAPIS Gn.)

P. subatomaria Wood. Caldwell (Cr); Orange Mts. VI, 22 (Gr), VIII, 16 (Kp); Newark, light, VI (Wdt); Elizabeth VI, VIII (Bz); Staten Island VI, VIII (Ds).

The varieties "unipuncta" Harv. and "deplanaria" Gn. occur with the type; these are in the previous list as species. The larva occurs on beech, alder, basswood, pine, spruce, fir and other evergreens.

STENOTRACHELYS Hulst.

S. approximaria Hbn. Lake Hopatcong (Pm); larva on "Smilax" and "Quercus."

LYTROSIS Hulst.

L. unitaria H. S. Newark (Soc); Caldwell (Cr).

"*Tornos scolopacinarius*" Gn. is a southern species and does not seem to occur with us.

EXILIS Gn.

E. pyrolaria Gn. May occur in New Jersey.

SELIDOSEMA Hbn.

S. humaria Gn. Paterson V, 12, VII, 20 (Gr); Caldwell (Cr); Forest Hill VII (Wdt); Newark VII, 20.

S. umbrosaria Gn. Staten Island VI, VII (Ds); Forest Hill, on hemlock IX (Wdt); Elizabeth VIII, 16 (Kp); Newark VII, 4; larva on horse-chestnut, elm, etc.

CLEORA Curt.

C. cribrataria Gn. Caldwell (Cr); larva on willow and poplar.

C. indicataria Walk. "New Jersey" (Pack).

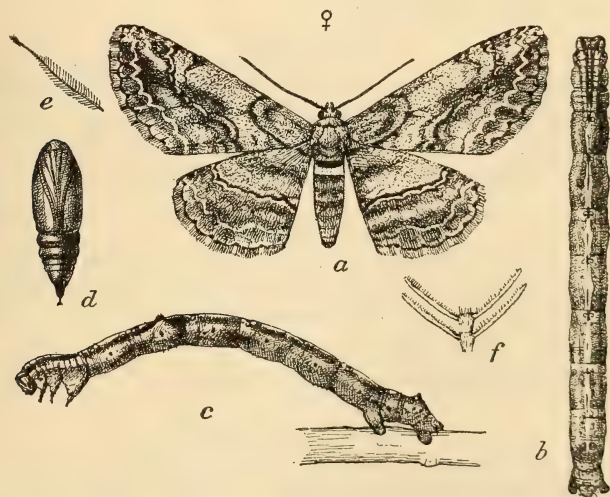


Fig. 210.—*Cleora pampinaria*: a, adult; b, larva from above; c, same from side; d, pupa, all enlarged; e, f., structural details still more enlarged.

C. pampinaria Gn. Paterson V, 27, VII, 20, VIII, 13 (Gr); Chester VII (Dn); Caldwell (Cr); Newark V–VIII (Soc); Staten Island IV, V, VII, VIII (Ds); New Brunswick IX, Jamesburg VIII, 11 (Coll); larva on apple, pear, strawberry, cranberry, willow, poplar, ash, etc.

C. larvaria Gn. Hopatcong (Pm); Orange Mts. IX (Wdt); Caldwell (Cr); larva on willow, wild cherry, etc.

C. areataria Bwl. Hemlock Falls IV, 22 (Bwl); Newark IV, 25 (Bz).

MELANOLOPHIA Hulst.

M. canadaria Gn. Throughout the State, III-VIII; larva on tamarack, spruce, pine, hemlock, "Myrica," etc.

ÆTHALOPTERA Hulst.

Æ. intertexta Walk. Paterson VII, 21 (Gr); Bloomfield V, VII (Wdt); Staten Island VII (Ds); Newark.

GLENA Hulst.

G. cognataria Hbn. Sandy Hook, VII (Ds).

ECTROPIS Hbn.

E. crepuscularia D. & S. Throughout the State IV to IX, common; larva on apple, pear, plum, elm, maple, clover, etc.

EPIMECIS Hbn.

E. virginaria Cram. (*hortaria* Fab.) Hopatcong (Pm); Chester VII, 5 (Dn); Elizabeth VIII, 4, (Kp); Staten Island V to VIII (Ds); Newark (Ang); larva on tulip tree.

LYCIA Hbn.

L. ursaria Walk. Hopatcong, Plainfield (Pm); Newark III, IV (Wdt, Bz); larva on poplar, elm, wild cherry, etc.

L. cognataria Gn. Throughout the State V to VIII; larva on a great variety of orchard, and small fruits and forest trees.

NACOPHORA Hulst.

N. quernaria S. & A. Orange Mts. V, 24 (Gr); Staten Island VI, VII (Ds); Jamesburg VII, 4 (Lt); Newark IV, 4 (Ang); Elizabeth VI (Bz); larva on oak, and "*Cratægus australis*."

N. cupidaria Grt. New York, rare (Bt).

N. phigaliaria Gn. Should occur in New Jersey.

PALEACRITA Riley.

P. vernata Peck. The larva is the spring canker-worm, an injurious species locally throughout the State. Moths in April or May. Larvæ



Fig. 211.

Fig. 211.—Spring canker wormn, *Paleacrita vernata*: a, male moth; b, wingless female; c, d, e, details of structure, enlarged.

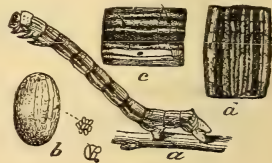


Fig. 212.

Fig. 212.—Spring canker worm: a, larva; b, egg, very much enlarged; c, d, body segments of larva.

most destructive in June. It rarely causes any notable loss with us, but has been troublesome near Mount Holly. Thorough spraying with the arsenites when the insects are first seen will prove effective.

PHIGALIA Dup. (RHAPHIDODEMAS Hulst.)

- P. titea** Cram. Paterson IV, 15, V, 1 (Gr); Staten Island III, IV (Ds); larva on rose, birch, maple, elm, etc.
P. olivacearia Morr. Plainfield (Pears), Staten Island III, 27 (Ds).

ERANNIS Hbn.

- E. tiliaria** Harr. The "lime tree moth"; occurs late in fall throughout the State, though hardly common; larva on basswood, elm, apple, pear, etc.

CINGILIA Walk.

- C. catenaria** Dru. Throughout the State, IX; larva on "Vaccinium," "Rubus," "Rhus toxicodendron," "Myrica," "Genista," "Quercus," etc.

ANAGOGA Hbn.

- A. pulveraria** Linn. Hopatcong (Pm); Staten Island V (Ds); larva on willow, hazel, beech, maple, birch, etc. The variety "occiduaria" occurs with the species.

SICYA Gn.

- S. macularia** Harr. Likely to be found in New Jersey.

THERINA Hbn.

- T. pellucidaria** G. & R. Lakehurst V, 18 (Coll), IV, V (Ds); larva on yellow pine.
T. endropiaria G. & R. Hopatcong (Pm); Morris Plains (Dyar); Paterson VI, 15 (Gr); Newark VI (Wdt); Staten Island V, VI (Ds); food plants, hornbeam, chestnut, red and white oak.
T. athasiaria Walk. Paterson IV, 21, V, 10 (Gr); Elizabeth IV (Bz); Lahaway V, 28; Cologne V, 24, common (Coll); larva on oak.
T. fiscellaria Gn. New Brunswick.
T. fervidaria Hbn. Paterson VII, 21 (Gr); Staten Island IX, X (Ds); Caldwell (Cr); New Brunswick IX, 20, Milltown IV, 28 (Gr); Atco IX, 27 (Kp); Jamesburg (Coll); larva on spruce.

METROCAMPA Latr.

- M. perlata** Gn. (margaritata Linn.) Hopatcong (Pm); Staten Island VI, VIII (Ds); Newark VIII, IX (Soc); Elizabeth IX (Bz); New Brunswick IX, X (Coll); larva on birch, elm, hornbeam, oak, poplar, willow, etc.

EUGONOBAPTA Warr.

- E. nivosaria* Gn. Lake Hopatcong VII, 6 (div); Orange Mts. VII, 4 (Lt); Newark VII (Wdt); Caldwell (Cr); Staten Island V, VI (Ds).

ENNOMOS Tr.

- E. magnarius* Gn. (*alniaria* Linn.) Hopatcong (Pm); Paterson VIII, 30, IX, 28 (Gr); Newark IX, X (Wdt); Staten Island IX-XI (Ds); New Brunswick X; locally common throughout the State; larva on birch, chestnut, elm, linden, maple, locust, etc.
- E. subsignarius* Hbn. Caldwell (Cr); Newark VII (Wdt); Staten Island VII, VIII (Ds); New Brunswick, Jamesburg (Coll); larva on apple, basswood, elm, linden, poplar, etc.

A most remarkable flight of these insects occurred at many points in New Jersey, New York and Canada in 1908, although the larvæ had not been noted as unusually abundant.

XANTHOTYPE Warr.

- X. crocataria* Fabr. Throughout the State, May to September, locally common; larva on strawberry, currant, gooseberry and "Polygonum."

PLAGODIS Hbn.

- P. serinaria* H. S. Staten Island VI (Ds); Newark VI, 10, VIII (Bwl, Ang), Milltown (Gr); larva on willow. The variety "*rosaria*" G. & R. will also be found in the State.
- P. altruaria* Pears. (*keutzingaria* Pack.) New Jersey, probably; larva on apple.
- P. fervidaria* H. S. Staten Island VIII; larva on maple and ash.
- P. alcoolaria* Gn. Staten Island V (Ds); the variety "*kempii*" Hulst, will also be found in the State.
- P. phlogosaria* Gn. Newark, VIII; larva on wild cherry.
- P. schuykillensis* Grossb. Staten Island (Ds).
- P. keutzingi* Grt. Almost certainly occurs in the State.
- P. emargataria* Gn. Elizabeth VII, 15 (Bz).
- P. purpuraria* Pears. Will probably be found in the State.

HYPERITIS Gn.

- H. amicaria* H. S. Occurs throughout the State, V to VII, commonly; larva on alder, beech, birch, hornbeam, "Hypericum," oak, etc. The form "*alienaria*" H. S. occurs with the type.

ANIA Steph.

- A. limbata* Harv. Newark VI, VII, on oak, Forest Hill V, 7 (Wdt); Staten Island VI, VII (Ds); Elizabeth IV-V (Bz); New Brunswick (Coll); feeds on most orchard and small fruits, also nut trees, maple, etc.

GONODONTIA Hbn.

- G. hypochraria* H. S. Hopatcong (Pm); Paterson VI, 7, Orange Mts. VI, 30 (Gr); Newark V, VI, VII (Wdt); Caldwell (Cr); Staten Island V-VII (Ds); larva on persimmon, apple and sassafras.
- G. warneri* Harv. Paterson VI, 15 (Gr); Gt. Piece Meadow V, 30 (Ds).
- G. duaria* Gn. Newark V, VI (div); Caldwell (Cr); Orange Mts. VI (Bz); Staten Island V-VI (Ds); Anglesea VI, 10; larva on red oak.
- G. obfirmaria* Hbn. Paterson V, 14 (Gr); Staten Island V (Ds); Caldwell (Cr); Clementon V, 10 (Kp); V, 15, very active and difficult to capture (Lt); Lahaway V, Cologne VI, Lakehurst V, 18, common (Coll); food plants "Vaccinium," "Cassandra."

EUCHLÆNA Hbn.

- E. serrata* Dru. Hopatcong (Pm); Caldwell (Cr); Staten Island VI (Ds); Elizabeth VI (Bz); Newark, New Brunswick VI, 20 (Gr); Woodbury VI, 8 (Kp); larva on maple and apple.
- E. obtusaria* Hbn. "New Jersey"; food plant touch-me-not, "Impatiens," chestnut.
- E. effectaria* Walk. Hopatcong (Pm); Chester VII (Dn); larva on rose.
- E. johnsonaria* Fitch. Hopatcong (Pm); Chester VIII, 11, IX, 1 (Dn); Caldwell (Cr); Newark VI, VIII (Soc); Elizabeth VIII, 19 (Kp); Staten Island (Ds); New Brunswick VI, 4, IX, 1 (Gr); Jamesburg VIII, 10, Anglesea IV, 20 (Sm); larva on oak, cherry, etc.
- E. amoenaria* Gn. Boonton VIII (Wdt); Caldwell (Cr); Staten Island VI, Farmingdale VIII, 12 (Ds).
- E. astylusaria* Walk. Paterson VI, 5 (Gr); Caldwell (Cr); Orange Mts. V (Wdt).
- E. vinulentaria* G. & R. Lakehurst, V (Ds).
- E. marginata* Minot. Newfoundland V, Lakehurst V (Ds); New Brunswick VI, 11 (Gr); Anglesea (Lt).
- E. pectinaria* D. & S. New Jersey, probably; food plants, oak, poplar, wild cherry.

EUTRAPELA Hbn. (SELENIA Hbn.)

- E. kentaria* Grt. Hopatcong (Pm); Newark (Wdt); food plants, basswood, beech, birch, maple, oak, etc.
- E. alciphearia* Walk. Elizabeth V, 12 (Bz). Larva on maple.

METANEMA Gn.

- M. inatomaria* Gn. Newark VIII; Staten Island V (Ds); food plant, poplar.
- M. determinata* Walk. Caldwell (Cr); Newark VIII.
- M. quercivoraria* Gn. (*textrina* G. & R.) Paterson V, 11 (Gr); Elizabeth V (Bz); Staten Island V (Ds); food plants, oak, elm, poplar, willow, "Uvularia perfoliata."

PRIOCYCLA Gn.

- P. armataria** H. S. Newfoundland VII, 5; Staten Island VI (Ds); Newark VI, 15 (Bwl); Elizabeth VI, 27 (Bz); larva on currant, gooseberry, birch, maple and apple.
- P. decoloraria** Hulst. Staten Island, summer 1908, collected by Pollard (Ds).

STENASPILATES Pack.

- S. zalissaria** Walk. Lakewood IV, 29 (Watson).

AZELINA Gn.

- A. ancetaria** Hbn. Throughout the State, V-VIII, common; food plant, maple. The variety "peplaria" Hbn. seems to be confined to the males, and most of the specimens of this sex are that form.

SYSSAURA Hbn.

- S. infensata** Gn. Paterson V, 3-VII, 11 (Gr); Chester (Dn); Newark VIII (Soc); Staten Island VII, IX (Ds); Bayside IX, 21, Anglesea, VI (Coll); the variety "biclararia" Walk. = "bicesaria" Walk. occurs with the type. Larva on juniper and white pine.

CABERODES Gn.

- C. confusaria** Hbn. Throughout the State, V-IX, in many varieties; larva on clover and dandelion.
- C. majoraria** Gn. Hopatcong (Pm); Caldwell (Cr); Newark VI, VIII (div); Staten Island VI, 17 (Ds).
- C. subochrearia** Hulst. New Jersey (Kp).

TETRACIS Gn.

- T. crocallata** Gn. Paterson VI, 10, IX, 16 (Gr); Caldwell (Cr); Chester VII, 4 (Dn); Newark VI, VIII (Soc); Staten Island V-VIII (Ds); larva on sumac, chestnut and spice bush.

SABULODES Gn.

- S. lorata** Grt. Hopatcong (Pm); Paterson VI, 12, 15 (Gr); Caldwell (Cr), Newark V, VI, VIII (Soc); Staten Island V, VI (Ds); larva on sweet fern, "Comptonia asplenifolia" and hemlock.
- S. arcasaria** Walk. (sulphurata Pack. = deontanata Grt.) Hopatcong (Pm); Del. Water Gap VII, 14 (Jn); Caldwell (Cr); Chester VII, 16, Newark VII, 22 (Dn); Orange Mts. VII (Wdt); Elizabeth VII, 20 (Kp); Staten Island V, VII, VIII (Ds); food plant, "Rhus" spp.
- S. furciferata** Pack. Paterson IV, 14 (Gr). May be an early variety of the preceding.
- S. transversata** Dru. Throughout the State VII, IX, X, common locally; larva on currant, maple, apple, "Polygonum," etc.

ABBOTTANA Hulst.

- A. clemataria** S. & A. Caldwell (Cr); Newark V, VIII (Soc); Staten Island V-VII (Ds); New Brunswick IV, 26 (Gr), and probably throughout the State; larva on elm, oak, hickory, sassafras and clematis.

Family BREPHIDÆ.

This peculiar little group of species contains only a single representative in our State, flying so early that it is not often taken by collectors. It has a resemblance to some of the frail forms of the owlet moths and yet more to some of the "Geometrid" series. The black-banded, reddish secondaries are quite characteristic as a superficial character, the venation serving to distinguish the family structurally.

BREPHOS Ochs.

B. infans Moesch. Staten Island, III, IV (Ds).

Family EPIPLEMIDÆ.

CALLEDAPTERYX Grt.

C. dryopterata Grt. Orange Mts. VI (Wdt); Newark VIII, 18 (Bwl); larva on "Viburnum nudum."

Super-Family TINEOIDEA.

Under this name is grouped a series of families which are not closely related in appearance and structure, and have no one superficial character that makes them all readily recognizable. Included in it are all the families that in the last edition are placed in the "series Tineides," and all that in more popular parlance are known as micro-lepidoptera. The essential characters are largely in the larval structures and in some peculiarities of venation, and, generally speaking, all caterpillars in which the false or pro-legs have a complete circle of spinules or crotches belong to this series. So in the adults, when the number of internal veins in the primaries exceeds one and in the secondaries exceeds two, the species belongs here. Other details will be given under the appropriate family headings.

Family LACOSOMIDÆ.

This family resembles the following "Psychidæ" in general structure, but has the wings closely scaled and fully developed in both sexes. The larvæ live similarly in bags or sacs, but these are always open at both ends.

LACOSOMA Grt.

L. chiridota Grt. Staten Island (Fulda), on oak near New York (Bt); Lakehurst, larva only on oak (div). It probably occurs throughout the State, but is decidedly rare.

CICINNUS Blanch.

C. melsheimeri Harr. Occurs throughout the State, May to July, always rare and usually beaten from oak trees. The larva feeds on oak and winterberry (Bt).

Family PSYCHIDÆ.

These are the "bag worms," so called because the larvæ make a case or sac, closed at one end, of leaves, chips or silk, in which they live and which they carry about with them. The male moths only are winged, the wings transparent or thinly scaled, black, the body very hairy, abdomen long and slender, antennæ pectinated. The females are grub-like and lay their eggs in the sac which they constructed as larvæ.

THYRIDOPTERYX Steph.

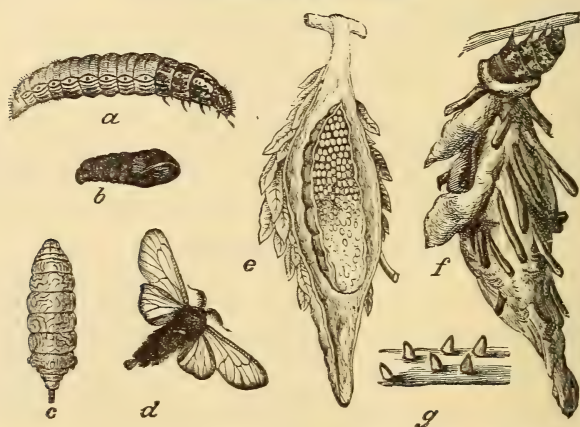


Fig. 213.—Bag worm, *Thyridopteryx ephemeraeformis*: a, larva; b, male pupa; c, adult female; d, adult male; e, bag cut open to show the egg mass; f, bag carried by feeding caterpillar; g, young larvæ in their first case.

T. ephemeraeformis Steph. The common "bag" or "drop-worm." Occurs throughout the State on a large variety of fruit, shade and ornamental trees, deciduous and coniferous. It is especially injurious to "Arbor vitæ" hedges, which are often entirely killed by it. The bags containing eggs hang on the trees all winter, the larvæ hatch in May, and adults appear in late August and September. Among remedial measures, picking off and destroying bags in winter takes first rank. During the growing season the larvæ succumb readily to arsenites, but on "Arbor vitæ" and conifers only arsenate of lead can be safely used.

EURYCYTTARUS Hamps. (PYSCHÉ Ochs.)

E. confederata G. & R. Paterson V, 25 (Gr); Ft. Lee V, 29 (div); Jersey City (Sb); Newark (Soc); Elizabeth VI, 15, VIII, 10 (Bz); DaCosta VI, 3 (Dke). It probably occurs throughout the State and is locally common, though not often found. The larvæ occur on the bark of oak, chestnut, dogwood, hemlock and pine early in the season, and Mr. Beutenmuller says it is two-brooded.

Family LIMACODIDÆ.

These are moderate sized or small moths, termed "Cochliidiidæ" in the last edition, with plump or shaggy bodies, retracted head, weak tongue and often pectinated antennæ. The wings are short and broad, often very thickly scaled, the colors usually brown, often with green markings.

The larvæ are even more easily recognized than the adults by their slug-like character. The feet are in large part obsolete, while the belly is flattened, soft and fleshy, the larva using the entire under surface in walking. Another peculiarity is the poisonous character of the spinous clothing, the tips being very finely pointed, easily broken off and extremely irritating when imbedded in the flesh. This "nettling" is sometimes very serious and may cause swellings, inflammation and even high fever. Local application of soda or zinc washes or dilute mixtures of phenol and soda usually afford relief.

Dr. Dyar says, concerning these larvæ, that most of them are feeders on any smooth-leaved tree, and this may be assumed unless special food plants are mentioned. None of them are really injurious to cultivated plants, although a number of such are fed upon.

SIBINE H. S.

S. stimulea Clem. Throughout the State, June and July, locally common. The larva is known as the "saddle-back" caterpillar and occurs in late summer on pear, cherry and apple, sometimes partially defoliating young trees. It also feeds on a great variety of other trees and plants and succumbs readily to arsenical sprays.



Fig. 214.—The saddleback caterpillar.

EUCLEA Hln.

E. delphinii Bdv. Occurs throughout the State, VI and VII. The larva in late summer on pear, cherry, oak, chestnut, blackberry, wax myrtle and a variety of other trees and shrubs. Five varieties based on color differences have been recognized, and all occur within our boundaries; they are "querceti" H. S., "interjecta" Dyar, "viridiclava" Wlk., "elliotii" Pears. and "pænulata" Clem.



Fig. 215.—*Sibine stimulea*: parent of the saddleback caterpillar.

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E. indetermina Bdv. Throughout the State, June and July, locally not rare. The larva on apple, cherry, rose, buttonball and a great variety of other trees and plants.

E. chloris H. S. Common throughout the State VI & VII. Larva a general feeder, including apple, pear and cherry.

MONOLEUCA G. & R.

M. semifascia Wlk. Morris Plains (Neum); Palisades (Jtl); rare near New York (Bt); Lakehurst VII, 12 (Bz). Mr. Joutel reports the larva in New Jersey, but says nothing of its food habits.

ADONETA Clem.

A. spinuloides H. S. Throughout the State, not rarely, VII & VIII. Larva in late summer on plum, cherry, bayberry and many other trees and shrubs.

A. leucosigma Pack. Occurs rarely with the preceding and is probably a variety; although that is disputed.

SISYROSEA Grt.

S. textula H. S. Ft. Lee (Bt); Newark (Soc); Elizabeth VI, VII (Bz); Staten Island (Ds); New Brunswick (Gr); Wenonah (Dke), and probably throughout the State. Larva on plum, cherry, oak, maple, chestnut, bayberry and many other trees and plants.

NATADA Wik.

N. nasoni Grt. Plainfield (Doll); Palisades (Jtl); Lakehurst (Gr). The larva only is reported in August on oak. It also feeds on many other trees.

PHOBETRON Hbn.

P. pithecium S. & A. The "hag-moth." G. d., but rare, in July.

The remarkable caterpillar is quite a general feeder and occurs on most of the ordinary orchard trees in late summer.

ISOCHÆTES Dyar.

I. beutenmulleri Hy. Edw. The larva has been taken by Joutel on Staten Island in September.

PROLIMACODES Schaus.

P. scapha Harr. Locally common throughout the State, VII, VIII. The larva until XI, feeding generally on trees and shrubs, including most of the usual orchard trees.

LIMACODES Latr. (COCHLIDION Hbn.)

L. biguttata Pack. Hopatcong VI, VII (Bt); Newark (Soc); Staten Island VII (Ds); Woodbury VI (Kp); Anglesea (Lt). The larva seems confined to oak.

L. rectilinea G. & R. Morris Plains (Bt); North Jersey (Sm).

L. y-inversa Pack. Piedmont Plain and northward; local and not common. Larva on hickory and blue beech (Dyar).

LITHACODES Pack.

- L. fasciola** H. S. Piedmont Plain and northward; recorded from many points in July and August; but not from any point to the south, although it probably occurs there as well. The larva is a very general feeder, including most of the orchard fruits, huckleberry, bayberry, etc.

The variety "laticlavaria" Clem. occurs with the type, but is less common.

PACKARDIA G. & R.

- P. geminata** Pack. Newark (Soc); Hemlock Falls VI, 10 (Bz); g. d., but rare in June. Larva on wild cherry, birch, oak and many other plants. The varieties "albipuncta" Pack., "ocellata" Grt., and "goodellii" Grt. occur with the type.
- P. elegans** Pack. Hopatcong VII (Bt); Morris Plains (Dyar); Ft. Lee (Wrms); Newark (Soc). Larva on many orchard, shade and forest trees, and on "Viburnum" (Wrms). The variety "fusca" Pack. occurs with the type.

HETEROGENEA Knoch.

- H. shurtleffii** Pack. Ft. Lee VII (Bt); larva on oak, chestnut and beech.

TORTRICIDIA Pack.

- T. flexuosa** Grt. Morris Plains, rare (Dyar); Ft. Lee (Bt), local in the Jersey City and Newark Dist. VI, VII; Elizabeth VII (Bz). Larva on a great variety of trees. The form "cæsonia" Grt. occurs with the type.
- T. pallida** H. S. Piedmont Plain and northward in June. Probably to the south as well; but I have no records. Larva on willow, oak, sycamore, bayberry, etc. The variety "flavula" H. S. occurs with the type.
- T. testacea** Pack. G. d., in the Piedmont Plain and northward, locally not rare. Adults May to July, larva on oak, birch, wild cherry, etc.

Family MEGALOPYGIDÆ.

Rather large moths with plump, very hairy body, the abdomen squarely truncated, antennæ lengthily pectinated in the male. The wings are short, broad and obtuse, also clothed with long hair, forming a surface which Prof. Comstock compares with flannel; and because of the wavy lines on the forewings, he calls the only species thus far found in our State the "crinkled flannel moth." The larvæ seem to have an extra pair of abdominal legs, and the cocoon is a curious case-like structure with a trap-door at one end.

The species "opercularis" S. & A., listed in the last edition, has not yet been found, and is therefore omitted.

MEGALOPYGE Hbn.

M. crispata Pack. Local throughout the State, VI-VIII. Larva on most orchard and small fruits and on many other trees and shrubs, but never abundant enough to be harmful.

Family PYROMORPHIDÆ.

Small, black or smoky-winged moths, nearly always with a red collar. The species are slight, rather frail in appearance, with two inner veins on primaries and three on secondaries. The antennæ of the male are pectinated.

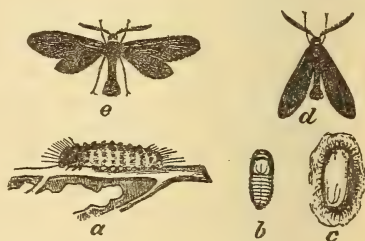


Fig. 216.—*Harrisina americana*: a, larva; b, pupa; c, cocoon; d, e, moths, wings closed and open.

ACOLOITHUS Clem.

A. falsarius Clem. Morris Plains (Dyar); Woodbridge VI, 17, Iona V, 26, Laurel Springs V, 23 (Dke); Anglesea V (div). Adult on flowers of beach-plum and wild cherry in May and June; larva on grape and Virginia creeper.

PYROMORPHA H. S.

P. dimidiata H. S. Plainfield VII (Bz); Staten Island VI (Ds); New Brunswick (Coll); Woodbury VI, 17, Wenonah VI, Iona V, 24, DaCosta VI, Manumuskin VI (Dke); Lahaway VI (Sm); never common. The larva feeds on dead oak leaves.

HARRISINA Pack.

H. americana Harr. Locally common everywhere V-VIII, and sometimes, as in the Egg Harbor district, injurious to certain varieties of grape. The yellow, black-dotted larvæ feed in company throughout most of their life, and are easily destroyed by hand-picking or the use of arsenate of lead.



Fig. 217.—Grape leaf with larvæ of *Harrisina americana* feeding in characteristic way.

- Z. pyrina** Fab. An introduced species which has spread northward from Hoboken to Paterson, southward across Staten Island and along the coast to Eatontown and westward to New Brunswick, causing more or less serious local damage to shade and orchard trees. It is strictly confined to cities and their immediate vicinity, where the sparrows dominate and exclude the native birds. The moths fly to electric lights VI and VII, often in large numbers, and the larvæ attack shade trees of almost any kind, but seem to prefer elm and maple.

COSSUS Fab.

- C. reticulatus** Lint. Taken rarely by the Newark collectors.
C. centerensis Lint. Guttenberg VI, 30 (Wrms); rare near New York (Bt); the larva in the trunks of poplar.

PRIONOXYSTUS Grt.

- P. robinæ** Peck. The most common native species of the family, and occurs throughout the State, VI & VII. The larva bores in the trunks of locust, willow, poplar, chestnut and oak, but in my experience prefers the latter. In the pine barrens thousands of oak trees are "doated" as the results of attacks by this species and useless except for firewood.
P. macmurtrei Guer. (*querciperda* Fitch.) Taken rarely by the Newark collectors in June. The larva in oak and chestnut.

Family SESIIDÆ.

Species of moderate or rather small size, with narrow forewings, one or both pairs more or less transparent, and color and habits of flight very generally resembling wasps. Black species with yellow or orange bandings are common, and sometimes the legs are also long and yellow like those of wasps or hornets. The antennæ are usually spindle-shaped and in the male often pectinated or lamellate, with a little tuft of hair on the tip.

The larvæ are borers without exception, and live in the stems, trunks, roots or branches of living trees and plants, often causing serious injury.

Mr. Beutenmuller's general arrangement is still followed, and Mr. George Engelhardt, who has of late studied the early stages, has been good enough to give me further information as to the food habits of a number of species.

MELITTIA Hbn.

- M. satyriniformis** Hbn. Common VII-IX throughout the State wherever squashes or other cucurbits are grown; the larva being the well-known squash borer. Where it occurs in destructive numbers the

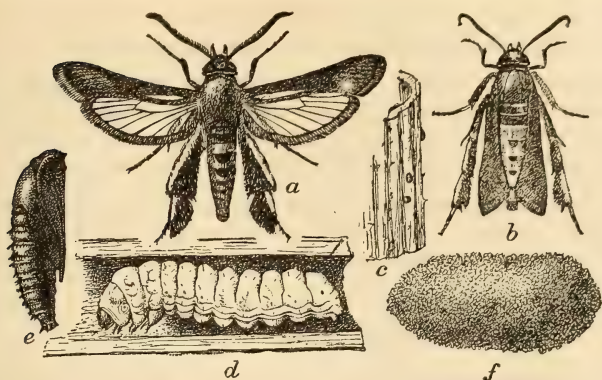


Fig. 220.—*Melittia satyriniformis*: a, male moth; b, female with wings closed; c, eggs on squash stem; d, larva; e, pupa; f, cocoon; all one-third enlarged.

larvæ may be cut out, or bisulphide of carbon may be injected into the stem, and the plants should be covered and rooted at the joints. In some cases summer squashes can be planted as traps to protect the late varieties.

ALCATHOE Hy. Edw.

A. caudatum Harr. Orange Mts., rare VIII (div); New Brunswick VII, 26 (Gr); the larva bores into the roots of clematis, and will occur wherever this plant grows. Mr. Engelhardt found it common at Bayonne a few years ago.

PODOSESIA Mœschl.

P. syringæ Harr. Paterson V, VI (Gr); Newark V (Wdt); g. d. and locally not rare. The larva in lilac, ash, mountain ash and pear. In lilac it is not infrequently more or less destructive, and infested shoots when noticed should be cut out and burnt.

MEMYTHRUS Newn.

M. tricinctus Harr. (Sciapteron) Paterson VI, 5, Little Falls VI, 25, VII, 12 (Gr). The larva bores in willow and poplar, and Mr. Grossbeck has found it in the galls made by "*Saperda concolor*." Mr. Engelhardt has seen the workings of the larva in New Jersey and thinks it may be found almost anywhere if properly sought for.

M. polistiformis Harr. "New Jersey" (Bt); Lakehurst VIII, 17 (div) Bamber VIII, 11 (Dke); the larva in the roots of wild and cultivated grape. This species is injurious in Virginia, and Mr. Engelhardt has found its work quite plentiful in an old vineyard at Lakehurst. It has not been found harmful with us as yet.

M. scepisiformis Hy. Edw. Holly Beach VIII, 2 (Haim).

M. simulans Grt. Larvæ found in swamp oak at Newark by Engelhardt, and pupa shells sticking out of oak trees elsewhere in the State by Beutenmuller.

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- M. palmii** Hy. Edw. Probably occurs at Lakehurst and elsewhere in South Jersey in red oak and scrub oak (Engelhardt).
- M. asilipennis** Bdv. (*Tarsa denudata* Harr.) Morris Plains (Neum); Paterson V, 30, Haledon, pupa found in oak stump, Milltown V, 30, Maurer V, 16 (Gr); Newark V, 18 (Sb); Jamesburg V, 9 (Sm). Larva in red and white oak, mostly in stump cut the previous year.
- M. dollii** Neum. (*Sciapteron*) Homestead, adults abundant end of May (Wrms); Newark (Ang); the larva bores in the trunks of young Carolina poplar, and the species probably occurs throughout the State.

ÆGERIA Fab. (TROCHILIUM Scop.)

- Æ. apiformis** Linn. Newark, rare (Soc); the larva bores in the roots and lower part of the trunks of Carolina poplar and willows. Mr. Engelhardt says it is local, but thinks it should be found elsewhere in New Jersey.
- Æ. tibialis** Harr. Riverton IX, 9, Brown's Mills IX, 15 (Dke). Bores in the trunks of willow and poplar.

BEMBECIA Hbn.

- B. marginata** Harr. Throughout the State, locally and seasonally common, VI, VIII, IX. The larva is the blackberry crown-borer which sometimes causes considerable injury in the southern section. It can be cut out, if sought for when the shoot first begins to wilt.

PARHARMONIA Neum.

- P. pini** Kell. Ft. Lee, abundant in pitch balls on white pine and spruce; at Lakehurst on pitch pine (Engelhardt).

SANNINOIDEA Beut.

- S. exitiosa** Say. Common, VI-IX wherever the peach grows in New Jersey. The larva is the well-known peach borer, which attacks the trees at or just beneath the surface of the ground and often kills young trees. These borers may be cut out in spring and fall, or the trees may be protected by wire-netting, newspaper, or a wash of cement, lime or other mechanical covering that extends two inches below and eighteen inches above the surface. The larva has also been found feeding in willow (Bt, Ang). The variety "edwardsii" Bt. occurs at Westville (Jn).

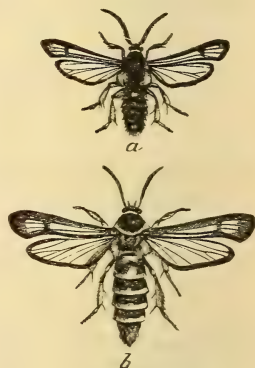


Fig. 221. — *Bembecia marginata*: a, male; b, female.

ALBUNA Hy. Edw.

- A. pyramidalis** Wlk. Sure to occur in North Jersey (Engelhardt).
A. fraxini Hy. Edw. (*Parharmonia*) "New Jersey," the larva in ash (Bt).

SESIA Fab.

- S. bassiformis** Wlk. Carlstadt, larva very abundant in iron weed (Engelhardt); Staten Island VIII (Ds); Merchantville VIII, 27 (Kp); Riverton VIII, 17 (Dke).
S. tipuliformis Linn. G. d., flies in VI, VII. The larva is the common currant borer, and I have found it or its work in all parts of the State. Where it occurs in harmful numbers, cutting out and destroying the infested canes is the only remedy.
S. bolteri Hy. Edw. Paterson, in the stems of willow, "*Salix concolor*" (Engelhardt).
S. pictipes G. & R. Garret Mt., Paterson VI, 2, larva in chestnut (Gr); Staten Island VI, VII (Ds); Elizabeth VII (Bz); New Brunswick, Riverton, Hammonton (Coll); Wenonah V, 30 (Dke). The larva bores in the trunks and branches of plum, cherry, peach and chestnut, but rarely does marked injury.
S. albicornis Hy. Edw. Morris Plains (Neum); Ft. Lee, Paterson (Engelhardt); Newark V, VI (div); the larva in willow galls and sometimes in Carolina poplar.
S. acerni Clem. Throughout the State; V-VII. The larva bores in the trunks of maples and sometimes ruins the younger shade trees; it is much more common, in my experience, in the more southern sections.
S. corni Hy. Edw. Hopatcong VII, 4 (Gr); Staten Island VI (Ds); Elizabeth VI, VII (Bz); the larva in maple. Mr. Engelhardt finds it quite common locally, on city trees, and says that it affects the branches rather than the trunk.
S. pyri Harr. Occurs throughout the State VI and VII. The larva infests apple, pear and mountain ash, and is sometimes locally abundant, favoring apple as a food plant. It has never been really harmful in my experience.
S. scitula Harr. Paterson V, 25, Jamesburg VII, 4 (Gr); Wenonah VII, 15 (Haim); DaCosta VI, 3 (Dke); breeds in and under the bark of oak, chestnut and hickory, and in the galls of "*Andricus cornigerus*" on oak.

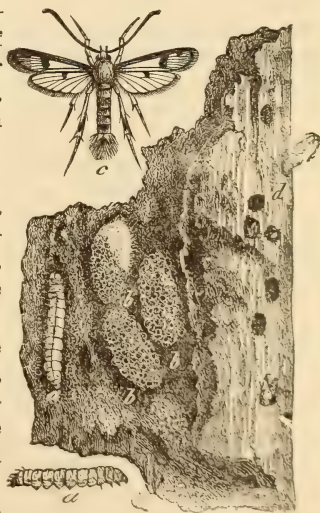


Fig. 222.—*Sesia acerni*: a, larvæ; b, cocoons in cavities made by larvæ; c, moth; d, pupa-shell from which moth has emerged.

- S. rubrostigma* Kell. Breeds in galls of "*Andricus davisii*" on "*Quercus nana*," often in company with "*scitula*," Ft. Lee and Lakehurst (Engelhardt).
- S. sigmoidea* Beut. Has been bred out of willow, by Mr. Joutel, in Van Cortland Park, New York City, and will almost certainly be found in New Jersey.
- S. pyralidiformis* Wlk. (*Carmenta*) Staten Island VIII (Ds); Collingswood VIII, 16 (Kp); Lakehurst, common (Engelhardt); Lucaston VIII, 27, IX, 9 (div); the larva in the roots of boneset and locally abundant.

Family PYRALIDÆ.

This consists of a large number of moderate-sized or small moths varying greatly in appearance, and having no one superficial character that makes them always recognizable. Structurally they agree in having the secondaries with three free inner veins the costal and sub-costal united for a short distance. The sub-families are as a rule more easily recognizable and have characters that make the bulk of the species placeable almost at sight.

The "*Pyraustinae*" have rather thinly scaled wings, the primaries pointed, secondaries never larger and sometimes very small. The colors are predominatingly yellowish and whitish with deeper yellow or almost transparent markings. Sometimes they are contrastingly white and black and a few are red, brown or of other shades. The body is as a rule slender, abdomen very long, head distinct, antennæ slender, in the males sometimes knotted or thickened. The larvæ are nearly always green with pale stripes and spots or without any markings at all. The head, a shield on the dorsum of the first thoracic segment and sometimes the tubercles are shining black or yellow. They live usually in webs or tents, and may be solitary, as is the rule, or social.

The "*Nymphulinae*" are similar but smaller, more brightly colored species with a tendency to narrower wings and angulated primaries. The larvæ tend to feed on water plants, and some of them are really semi-aquatic in habit.

The "*Scopariinae*" are broader winged, dull ashen gray or blackish species with broader secondaries and raised scales in the primaries, especially in the males.

The "*Pyralinae*" vary more than the preceding in color and in wing form. But as a rule the primaries are trigonate with reddish or brown colors, the secondaries proportionate, tending to continue the markings of the primaries. Some, however, have the fore-wings broad and shouldered, almost like the Tortricidæ. In this family we have the hay worms and other web-worms attacking stored products. It contains proportionately more troublesome species than any of the other sub-families, although none are destructive to growing vegetation.

The "*Chrysauginæ*" contain gray and blackish species, the primaries more or less shouldered, the secondaries usually without markings and broader than primaries. There are no injurious species.

The "Schœnobiinæ" contain species allied to and not readily separable from the next family by superficial characters.

The "Crambinæ" have very long, straight palpi, narrow primaries which are sometimes drawn to a point, and broad secondaries without markings. The primaries are usually white or yellowish, streaked with silvery and often banded with golden scales forming beautiful combinations. When at rest the wings are wrapped closely around the body, so that the moths look like little cylinders tapering from the tip of the palpi to the end of the squarely truncate wings.

The larvæ live in silken tubes near and sometimes below the surface of the ground, often on grass-roots, and a few of them become destructively injurious on cultivated crops.

The "Galleriinæ" or bee-moths are curiously streaked creatures, with a notch at the end of the fore-wing in the typical species, the costa very decidedly arched. The larva of the true bee moth lives on wax in bee hives, mining a gallery lined with silk through the centre of the combs out of sight of the bees. There is not much chance for them, however, in modern hives carefully looked after.

The "Epipaschiinæ" are broad-winged gray moths with black and sometimes brown markings, and habits similar to the next series.

The "Phycitinæ" are ashen gray slight species, with narrow primaries and broad immaculate secondaries. The vestiture has usually a silken or glistening appearance, and sometimes the contrasts in white and black are quite strong. The larvæ differ greatly in habit, some are borers in stalks or stems of plants, some live in seeds or flower heads, quite a number of them are leaf-crumplers and one species is predatory, feeding on scale insects. In almost all cases they live in silken tubes. A few are of economic importance.

Sub-family PYRAUSTINÆ.

GLAPHYRIA Hbn.

- G. glaphyralis* Gn. (Homophysa) Essex Co. VII (Kf); Waverly VI (Wdt); Westville VII, 2 (Lt); Wenonah VII, 17, 5-mile beach VII, 29 (Haim).
- G. sesquistrialis* Hbn. Westville VII (Lt); Lacy VII (Dke); Holly Beach VII (Haim).
- G. invisalis* Gn. Wenonah VII, 15-28 (div); Holly Beach VII, VIII (Haim).
- G. psychicalis* Hulst. Holly Beach VII, 29-VIII, 6 (Haim); Lucaston VIII, 6, Anglesea VIII, 4 (Dke).
- G. fulminalis* Led. 5-mile beach VIII, 27 (Haim).

SYMPHYSA Hamps.

- S. adelalis* Kearf. 5-mile beach; the larvæ make large, whitish, dumb-bell shaped cases of the white lichen, on which they feed on the trunks of oak, holly and other trees. Adults VII, VIII.

LIPOCOSMA Led.

- L. fuliginosalis** Fern. Essex Co. VIII (Kf); 5-mile beach VI, VII (div).
L. sicalis Wlk. Jamesburg VII, Westville VII (Lt); Wenonah V (Haim);
 Iona VI (Dke).

HYMENIA Hbn.

- H. perspectalis** Hbn. Newark X, 4, at light (Wdt).
H. fascialis Cram. (*recurvalis* Fabr.) Newark.

DESMIA Westw.

- D. funeralis** Hbn. Morristown (U S Ag); Newark VIII, at light (Wdt);
 Jamesburg VII (Lt); Merchantville V, VIII (Dke); Montclair VI, Anglesea V-VII, common (div); larva on grape and the species is probably g. d.
 var. **subdividalis** Grt. Woodside VIII (Wdt); Woodbury VI (Dke).
 "Samea ecclesialis" Gn. is Floridian and its record in the last edition was erroneous.

DIASTICTIS Hbn.

- D. argyralis** Hbn. (*Pyrausta*) Throughout the State V-VIII; the variety "ventralis" Grt. with the type.

PILOCROCIS Led.

- P. ramentalis** Led. Newark VI, 9, rare (Wdt).
 "Conchylodes platinalis" Gn. has not yet been taken, and as its distribution is southern is omitted.

BLEPHAROMASTIX Led.

- B. stenialis** Gn. (*Hydrocampa*) Orange Mts., Montclair, Newark VI, VII, at light, common (div); Jamesburg VII (Lt); Riverton V, 30 (Coll); Wenonah VI, Lucaston VI, Lacy VII (Dke); Anglesea V, 28-VII, 16 (div).
B. ranalis Gn. (*Pyrausta*) Bergen, Hudson and Essex Co, g. d V-VII (div); Westville VII, 2 (Lt); Jamesburg VII, VIII (Coll); Lucaston V (Dke).
B. limata G. & R. (*Pantographa*) Throughout the State, not rare. Larva on oak, between folded leaves (Kf).

DIAPHANIA Hbn. (MARGARONIA Hbn.)

- D. nitidalis** Cram. Newark; "New Jersey;" larval habits as in "hyalinata."

- D. hyalinata** Linn. Newark (Wdt); Ocean Co., not rare; larva in stems of Cucurbs, but not injurious in New Jersey.
- D. quadristigmalis** Gn. Jersey City Hts. VII, 20 (Sb); Montclair VI, at light (Kf); Newark VI, VII (Wdt).

EVERGESTIS Hbn.

- E. straminalis** Hbn. Throughout the State, common, V-VII.
- "E. rimosalis" Gn. has not been taken as yet and is omitted.

CROCIDOPHORA Led.

- C. serratissimalis** Zell. Essex Co., common VI, VIII (div); New Brunswick (Coll); Westville VI, 5-mile beach VI, VIII (Haim).
- C. tubercularis** Led. Orange Mts. VI, VII, common (div); Ft. Lee VII (Kf); 5-mile beach VI, 18 (Haim).

NOMOPHILA Hbn.

- N. noctuella** S. V. Common throughout the State, all season.

PACHYZANCLA Meyr.

- P. bipunctalis** Fabr. Montclair VIII, at light (Kf); rare.

LOXOSTEGE Hbn.

- L. dasconalis** Wlk. Essex Co VII (Kf); Newark (Sm); Brown's Mills VI, 15, Manumuskin VI, 4 (Dke).
- L. chortalis** Grt. Lahaway V, 20 (Sm); Brown's Mills V, 30 (Dke).
- L. oblitalis** Wlk. Essex Co. V-VIII (div); Elizabeth VIII (Kp); New Brunswick (Coll); 5-mile beach VII, Cape May VI (Haim).
- L. mancalis** Led. New Brunswick (Coll).
- L. helvialis** Wlk. Jersey City Hts. VII (Sb); Montclair VIII, common (Kf); Lincoln Park VII (Dke); Anglesea V-IX, common (div).
- L. similalis** Gn. Throughout the State, common; the larva is the "garden web-worm," locally a pest in other States, not injurious in New Jersey.
- L. commixtalis** Wlk. (**cereralis** Zell.) Jamesburg VII, 4 (Lt); Camden VI (Kp); Westville V, 4 (Lt); Lahaway V, 20 (Sm); Manumuskin V, 12 (Dke).

"L. sticticalis" of the previous list is a misidentification, and "L. allec-talis" has not been actually taken; both are therefore omitted.

THOLERIA Hbn. (MECYNA Gn.)

- T. reversalis** Gn. Essex Co. IX, larva on Baptisia tinctoria (Kf); Jamesburg VII, 28 (Lt); 5-mile beach VI, VII (div).

PERISPASTA Zell.

P. cæculalis Zell. Essex Co. VI, g. d. (Kf).

PHLYCTÆNIA Hbn.

P. ferrugalis Hbn. Throughout the State, V–XI, not rare.

P. acutella Wlk. 5-mile beach VI, VIII, rare (div).

P. terrealis Tr. Orange Mts., Essex Co. V, VI, at light (Kf).

P. extricalis Gn. Essex Co. VI, at light (Kf); New Brunswick V, Jamesburg VI, 16, Lahaway V, 20 (Coll); Laurel Springs V, 28 (Dke); Lucaston IX (Haim).

P. helvalis Wlk. (*Pyrausta*) Ft. Lee (Bt); Newark Dist. g. d. VI, VIII, X (div); Clementon V, 17 (Dke); larva on broad-leaf willow (Kf).

P. tertialis Gn. Denville (Bwl); Montclair VI, at light (Kf); Newark VI (Wdt); Elizabeth VIII (Kp); Wenonah V (Haim); Clementon V (Dke); Anglesea V, VIII (div).

CINDAPHIA Led.

C. bicoloralis Gn. Throughout the State V, VI, IX, not rare at light.

PYRAUSTA Schranck.

P. pertextalis Led. Essex Co. VI (Kf); Newark (Sb); Jamesburg VII, 5-mile beach VIII (Haim).

P. fissalis Grt. Essex Co. VII; larva on sassafras and golden rod (Kf).

P. æglealis Wlk. Essex Co. VII, larva on poke-berry (Kf); Woodland Cemetery VII, 4 (Sb); Newark VIII, rare (Wdt); Wenonah VII, 27 (Dke).

P. thestealis Wlk. Ft. Lee on "*Clethra alnifolia*" (Bt); Essex Co. VI, VIII (Kf); Woodside V, VI, VIII, X (Wdt).

P. theseusalis Wlk. Forest Hill (Wdt); New Brunswick VIII, larva webbing up tips of ferns (Coll); Glassboro VII, DaCosta VI, Brown's Mills VII, Toms River VII (Dke); Holly Beach VIII, 3 (Haim).

P. langdonalis Grt. New Jersey, probably.

P. oxydalis Gn. Orange Mts. VII, 19 (Kf); Waverly VII (Wdt); Newark (Soc); Holly Beach VIII, 3 (Haim).

P. elealis Wlk. Stone Harbor VIII, 15 (Dke); 5-mile beach VII, 1–VIII, 5 (div).

P. orphisalis Wlk. (*adipaloides* G. & R.) Great Notch V, 6 (Dke); Orange Mts. IV, V, VII, common (Kf); Newark X (Wdt); larva on "*Monarda fistulosa*" (Bt); Atco IX, 8 (Bwl); Anglesea VIII, 20 (Haim).

P. submedialis Grt. Occurs near New York (Bt).

- P. fumalis* Gn. Great Notch VIII, 27 (Dke); Essex Co. VII, VIII (Kf); Newark VIII (Wdt); Anglesea VI, IX (Sm).
- P. illibalis* Hbn. Essex Co. VI (Wdt); Anglesea VI, 10-VII, 21 (div).
- P. penitalis* Grt. (*nelumbialis* Sm.) Jersey City Hts. V (Sb); Newark VIII (Wdt); Essex Co. V, VI (Kf); New Brunswick VII, Bordentown, Riverton, the larva in stems and flowers of the Egyptian lotus (Sm) and in stems of cat-tail flags, etc. (Kf); 5-mile beach VII (Haim).
- P. futilalis* Led. Montclair VI (Kf); Orange Mts. VI, VII (Wdt); Holly Beach (Haim); larva on dog-bane.
- P. unifascialis* Pack. Fort Lee (Bt).
- P. phoenecialis* Hbn. (*opalizalis* Gn.) Orange Mts. V, g. d. (div).
- P. acronialis* Wlk. Fairmount Cemetery V, 21 (Sb); Holly Beach VIII, 5 (Haim).
- P. borealis* Pack. Recorded as near New York City (Bt).
- P. insequialis* Gn. Fairmount Cemetery IV (Sb); Orange Mts. V-IX (div); Irvington V, VI (Wdt); Newark, Jamesburg V (Coll); Manumuskine IV (Dke); larva on thistle.
- P. laticlavata* G. & R. Westville VIII (Kp); Brown's Mills VII (Dke); Anglesea VI, VIII, IX (div); Mt. Holly VIII, Cape May VI, 30 (Haim).
var. *cinerosa* G. & R. Orange Mts. VII, VIII (div); Cape May Co. (Coll).
- P. chalybealis* Fern. Essex Co. VIII, not rare, g. d.; pupa under bark of hickory, larva probably on nearby weeds; generally mistaken in collections as var. "*cinerosa*" of the preceding species (Kf).
- P. unimaculata* G. & R. Fort Lee district (Dow).
- P. signatalis* Wlk. Elizabeth VIII, 25 (Kp); Mt. Holly VIII (Haim); Atco (Lt); Hammonton VIII (Dke); Anglesea III, VII-IX (div).
- P. octomaculata* Linn. Throughout the State; not common.
- P. niveicollis* Grt. Orange Mts., g. d. VI, VIII (Wdt).
"P. fodinalis Led." is omitted as Western.

EUSTIXIA Hbn.

- E. pupula* Hbn. Throughout the State and almost all season.

Sub-family NYMPHULINÆ.

NYMPHULA Schrank. (HYDROCAMPA.)

- N. maculalis* Clem. Essex Co. VI, VII, at light (Kf); Lahaway V, 20 (Sm); Lucaston V, VI, IX, Brown's Mills VII, Tuckerton VIII (Dke); Anglesea (Haim).
- N. allionealis* Wlk. Essex Co. VI, at light (Kf); Lucaston IX (Haim); Hammonton VIII, IX, Toms River IX, 22 (Dke).
- N. obscuralis* Grt. Occurs near New York City (Bt). Larva on *Vallisneria spiralis* (Hart).

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- N. badiusalis* Wlk. (*albalis* Rob.) Essex Co. VIII, 24, at light (Kf); Newark VI, IX (Wdt); Gloucester Co. VI (Haim); Newbold VII, VIII (Dke).
N. oblitalis Wlk. Riverton II, the larva living in cases on the leaves of lily and other water plants in greenhouses; rare outdoors in summer.
N. gyralis Hulst. Anglesea (Lt).
N. icciusalis Wlk. Riverton VIII, DaCosta VII, Lucaston VI, Hammonton IX (Dke); Lahaway V, along ditches (Sm); Anglesea V, VII, VIII (div).
N. ekthlipsis Grt. New Brunswick (Coll).

ELOPHILA Hbn. (CATACLYSTA Hbn.)

- E. bifascialis* Rob. Montclair, electric light VI, 9, 15 (Kf).
E. claudialis Wlk. Lacy, Brown's Mills VII, 21, 22 (Dke); Anglesea VII, 9 (Haim).
E. fulcalis Clem. Boonton VIII (Bwl); Ft. Lee (Dow); Essex Co., common at light VI (Kf); New Brunswick VII, Anglesea (Coll).

GESHNA Dyar.

- G. primordialis* Dyar. Very abundant in the woods of North Jersey VI, VII; dozens fly up at every footstep (Kf); Ft. Lee (Dow); Wenonah VII (div); Brown's Mills VI (Dke).

DIATHRAUSTA Led.

- D. reconditalis* Wlk. (*pisusalis* Wlk.) Caldwell, Montclair, Newark, g. d. VI-VIII (Kf); Great Notch VIII, 26 (Dke).

Sub-family SCOPARIINÆ.

SCOPARIA Haw.

- S. centuriella* S. V. Hopatcong (Bt); Montclair VI, at light, g. d. (Kf); New Brunswick (Coll).
S. basalis Wlk. (*libella* Grt.) Orange Mts. VI, Woodside IX, on hemlock (Wdt); Essex Co. VI-IX, g. d., common in woods and at light (Kf); Wenonah VII, 27 (Dke); Gloucester Co. VII, 15 (Haim).

Sub-family PYRALINÆ.

AGLOSSA Latr.

- A. cuprealis* Hbn. Jersey City Hts. VI, 28, Newark (Sb); Montclair VII, 1 at light (Kf); Anglesea VII, 6-24 (div).
A. cuprina Zell. Montclair VII, 1, at light (Kf); Denville VI, 14 (Bwl).

PYRALIS Linn.

- P. farinalis* Linn. Throughout the State; the larva in stored products, chiefly grain. Usually occurs only in waste material and corners, so that cleanliness and care only are necessary to get rid of it.
- P. costiferalis* Wlk. From New York and Penn., and will be found in New Jersey. Very close to "cuprealis," and no doubt mixed with that species in collections (Kf).
- P. disciferalis* Dyar. Occurs all around New Jersey and will be found within the State (Kf).

HYP SOPY G I A Hbn.

- H. costalis* Fabr. (*Pyralis*) Throughout the State, all season. The larva is the "clover-hay worm," and sometimes injurious.

HERCULIA Wlk.

- H. intermedialis* Wlk. Montclair VI, 13 at light, g. d. (Kf); Plainfield (Mrs. Herring).
- H. cohortalis* Grt. Montclair VI, 13-VII, 1, at light, g. d. (Kf).
- H. olinalis* Gn. Throughout the State V-VII, often at light.
- H. himonialis* Zell. Essex Co. VI, at light (Kf); Jamesburg VI, 16 (Coll). Almost without doubt the same as "olinalis" (Kf).

All the species were under "Pyralis" in last edition, and "sodelis" is omitted as unlikely to occur in the State.

OMPHALOCERA Led.

- O. cariosa* Led. Near New York on "Anoma triloba" (Bt).
- O. dentosa* Grt. Very close to "cariosa," and will be found mixed with it in New Jersey collections (Kf).

Sub-family CHRYS AUGINÆ.

TOSALE Wlk. (FABATANA Wlk.)

- T. oviplagalis* Wlk. Essex Co. VI, VII (Kf); National Park VI (Dke); Gloucester Co. V, 29 (Haim); Ocean Co., not rare (Coll).

ART A Grt.

- A. statalis* Grt. Montclair VII (Kf); Elizabeth VII (Wdt); Anglesea VII (div).

CONDYLOLOMIA Grt.

- C. participalis* Grt. Ft. Lee Dist. (Dow); Essex Co. VII, g. d., abundant in open woods (Kf); Jamesburg VII, 4 (Haim).

GALASA Wlk.

- G. rubidana** Wlk. Common everywhere at light (Kf); Newark, New Brunswick (Coll); Anglesea VII (div).

Sub-family SCHÆNOBIINÆ.

SCHÆNOBIUS Dup.

- S. sordidellus** Zinck. Newark VI, VII, Elizabeth VII, at light (Wdt); 5-mile beach (Haim).
S. unipunctellus Rob. Anglesea IX, 3 (Lt).
S. tripunctellus Rob. Montclair VII, 7, at light (Kf).
S. melinellus Clem. Denville (Bwl); Anglesea (Lt).
S. forficellus Thumb. Montclair VI, at light (Kf); Anglesea VI-VIII (div).
S. clemensellus Rob. Montclair VI, 5, VII, 2, at light (Kf); 5-mile beach VII, VIII (Haim); Cape May VI, 7 (Dke).

Sub-family CRAMBINÆ.

PRIONAPTERYX Steph.

- P. nebulifera** Steph. Jamesburg VII, 4 (Kf); Lakehurst VII (div); Lucaston VII, Iona VII, Weymouth VII, VIII, Brown's Mills VI, Manumuskine VI, bred from larvæ constructing tube of silk and sand, attached to stalks of sand myrtle and huckleberry and feeding on the leaves (Dke).
P. achatina Zell. Jamesburg VI, 20 (Sm); Wenonah VII (Haim); DaCosta (Dke); Anglesea VII, 5-27 (div).

RAPHIPTERA Hamps.

- R. minimella** Rob. Newark VIII, 19 (Wdt); Lucaston VIII, IX (div); Toms River IX, 22 (Dke).
R. argillaceella Pack. Will be found in northern part of State (Kf).

CRAMBUS Fab.

- C. satrapellus** Zinck. Wenonah VII, 15 (Haim); Lucaston VII-IX (div); Lacy VII, Brown's Mills VII, VIII (Dke).
C. hastiferellus Wlk. Elizabeth IX (Kp); Brown's Mills VI, 16, Stone Harbor VIII, 3 (Dke); 5-mile beach VII-IX (div).
C. præfectellus Zinck. Newark, Montclair V, VIII (Kf); Jamesburg V (Sm); DaCosta VI, Brown's Mills VI, Stone Harbor VII (Dke); Clementon IX, Anglesea V (Lt).
C. leachellus Zinck. Throughout the State V-IX; common.
C. laqueatellus Clem. Throughout the State, V, VI and VIII; not rare.
C. bidens Zell. Lacy VII, 13 (Kf); Brown's Mills VII, 21 (Dke).

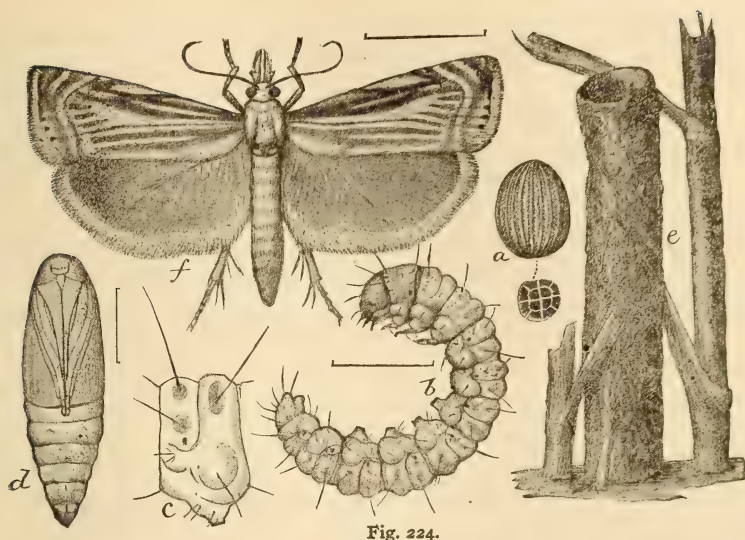


Fig. 224.

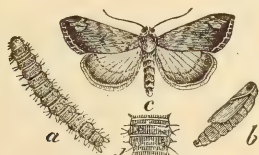


Fig. 223.



Fig. 226.

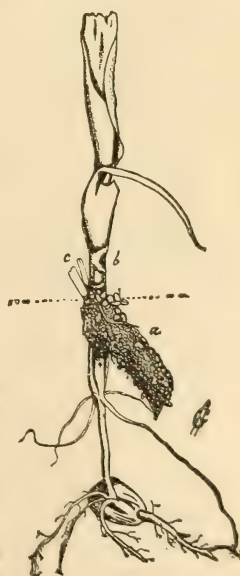


Fig. 225.

Fig. 223.—*Evergestis rimosalis*, allied to *E. straminealis*: a, larva; b, pupa; c, adult.

Fig. 224.—Cranberry girdle-worm, *Crambus hortuellus*: a, egg; b, larva; c, a single segment; d, pupa; e, tube made by larva; f, adult, all much enlarged.

Fig. 225.—Corn-root web worm at work.

Fig. 226.—Root web worm, *Crambus vulvivagellus*: a, larva; b, over- c. under-ground tube and cocoon; d, e, f, moths, wings spread and at rest; g, egg very greatly enlarged.

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- C. *pascuellus* Linn. Jamesburg VII, 4 (Lt); the larva feeds on grasses, and that is true of most of the species in this genus.
- C. *daeckellus* Haim. DaCosta VI, 3, Brown's Mills V, 27-VI, 17, type locality (Dke); Clementon V, 9 (Lt).
- C. *girardellus* Clem. Great Notch, Ft. Lee, Brown's Mills, all VII (Dke), Essex Co. VI, VII, common at light (Kf); Newark VII (Wdt); Elizabeth VII (Kp); Jamesburg VII (Lt).
- C. *alboclavellus* Zell. Throughout the State VI, VII, locally common; one of the cranberry bog species, although not a cranberry feeder.
- C. *agitatellus* Clem. Throughout the State with the preceding, than which it is less common and of which it is a variety (Kf).
- C. *multilineellus* Fern. Brown's Mills VI, 16, VII, 21 (Dke).
- C. *elegans* Clem. Essex Co. VI-IX, very common in open woods and at light (Kf); New Brunswick VII, IX (Coll); Delair VIII, Wenonah VII (Dke); 5-mile beach VII, VIII (Haim).
- C. *albellus* Clem. With the preceding, under the same conditions.
- C. *turbatellus* Wlk. Waverly V, VI (Wdt).
- C. *perlellus* Scop. Still only a probability in New Jersey.
- C. *hortuellus* Hbn. Orange Mts. VI, 27 (Bwl); Newark at light VIII, IX (Wdt); Laurel Springs VII, Stone Harbor VII (Dke); Anglesea VII (Lt); throughout the cranberry region of New Jersey V-VIII and sometimes common on the bogs. The larva is the "girdle worm," and does some injury locally, but much less than in Massachusetts; with us it is cranberry feeder incidentally only, its chief food being the bog grasses.
- C. *decorellus* Zinck. Montclair VI, VIII (Wdt); Wenonah VII, 20 (Haim); Anglesea VIII (div).
- C. *ruricolellus* Zell. Common everywhere V-IX; larva on grass and sorrel.
- C. *vulvivagellus* Clem. Throughout the State VIII, IX, usually common. The larva is one of the root web-worms and sometimes seriously injurious to corn planted on old sod-land in South Jersey. Remedial measures are late fall or early spring plowing of the sod and the free use of the salty mineral fertilizers.
- C. *teterellus* Zinck. Throughout the State VI-IX, locally common.
- C. *mutabilis* Clem. Common everywhere (Kf); Newark VII (Wdt); Elizabeth VIII (Kp); Brown's Mills VII, Stone Harbor VIII (Dke); Anglesea VI-VIII (div); Cape May VI (Haim).
- C. *caliginosellus* Clem. Throughout the State VI, VII, more or less common; has the same larval habits as "vulvivagellus" and also injures corn.
- C. *zeellus* Fern. Essex Co. VI, VII, not uncommon (Kf); Wenonah VII (Dke); also a root web-worm, though not an injurious one in our State.

- C. luteolellus* Clem. Essex Co. VI, VII, common (Kf); Bloomfield VII (Wdt); New Brunswick (Sm); Brown's Mills VII (Dke); Wenonah VII, 5-mile beach VI, VII (Haim).
- C. trisetus* Wlk. Throughout the State VI-IX, locally common.

THAUMATOPSIS Morr.

- T. edonis* Grt. Newark at light VIII (Wdt); Clementon IX (Lt); Lucaston IX, Hammonton IX (Dke).
- T. plexella* Zell. Newbold VI, 22 (Dke).
- T. striatella* Fern. (*daeckella* Kearf.) Lucaston X, 7-15, Brown's Mills X, 6 (Dke).
- T. fernaldella* Kearf. Anglesea VI, IX (Dke).

ARGYRIA Hbn.

- A. nivalis* Dru. Common throughout the State in low meadows; excessively so in late summer along the marshes at Anglesea.
- A. argentana* Martyn. Shark River (Bt); Lucaston VIII, 10, Atlantic City VII, 7 (Dke); Anglesea IX (Sm).
- A. auratella* Clem. Throughout the State VII, VIII, not rare.

DIATRÆA Guild.

- D. idalis* Fern. Newark, Anglesea IX, at light (Sm); Newbold VIII, National Park VII, 13 (Dke).

CHILO Zinck.

- C. plejadellus* Zinck. National Park VI, 10 (Dke); Gloucester Co. V, 29 (Haim); the larva bores in stems of rice and allied plants.
- C. densellus* Zell. Montclair, light V, 23 (Kf); 5-mile beach VI, 18, VIII, 6 (Haim).
- C. squamulellus* Zell. Wenonah VII, 28 (Haim); Anglesea VI, VII (div).
- C. forbesellus* Fern. Anglesea VII, 10 (Lt).

HAIMBACHIA Dyar.

- H. placidellus* Haim. Essex Co. VI, 10-VIII, 1 (Kf); Wenonah VIII, 20 (Haim).

CHALCŒLA Zell.

- C. iphitalis* Wlk. (*aurifera* Zell.) Single specimens occur in various parts of the State, but I have no definite records.
- C. principialis* Wlk. Montclair, electric light V, 31 (Kf).

DICYMOLOMIA Zell.

- D. julianalis* Wlk. Woodside VII, Orange Mts. VII, Newbold VII, VIII (Dke); Anglesea VI, 22 (Kf).

Sub-family GALLERIINÆ.

GALLERIA Fab.

- G. melonella Linn. The "bee-moth," throughout the State; larva infests bee-hives, running galleries lined with silk through the comb, and sometimes causing serious injury.

APHOMIA Hbn.

- A. sociella Linn. Recorded from "New Jersey."

PARALIPSA Butl.

- P. terrenella Zell. Montclair IX, 2, at light (Kf).

ACHROIA Hbn.

- A. grisella Fabr. Recorded from "New Jersey."

Sub-family EPIPASCHIINÆ.

EPIPASCHIA Clem.

- E. superatalis Clem. Montclair VI (Kf); larva on sumac.
E. zelleri Grt. Manumuskin VI, 4 (Dke); Anglesea VI, 22 (Kf).

ONEIDA Hulst.

- O. lunulalis Hulst. Will be found in the Highland region of N. J. (Kf).

BENTA WLK.

- B. asperatella Clem. Montclair VI, VII (Kf); Newark; larva on locust.

LANTHAPE Clem.

- L. platanella Clem. New Brunswick; the larva makes a web on the under surface of the leaves of sycamore.

WANDA Hulst.

- W..baptisiella Fern. Ft. Lee Dist. (Dow); Union Co. VII, 1 (Kf); Manumuskin VI, 25 (Dke); the larva on "Baptisia."

TETRALOPHA Zell.

- T. militella Zell. Newark VII, 5 (Wdt).

Sub-family PHYCITINÆ.

ACROBASIS Zell.

- A. demotella Grt. Montclair VI, 13, at light (Kf); the larva bores into the ends of twigs of black walnut.

- A. angusella** Grt. Found near Brooklyn, N. Y., the larva boring into the leaf stems of hickory.
- A. caryæ** Grt. Ocean County, not rare; the larva bores into the twigs of hickory.
- A. rubrifasciella** Pack. Near New York City (Bt); Holly Beach VII (Haim); the larva in a case between leaves of sweet fern and alder.
- A. betulella** Hulst. Montclair, the larvæ in tubes between birch leaves (Kf).
- A. comptoniella** Hulst. Common near New York City; the larva in a case between terminal leaves of "Comptonia" and "Myrica."
- A. hebescella** Hulst. Ocean Co. VI, larva in a case on oak.

The species in this series have not been well collected in New Jersey, and others will be found. In general, specimens must be bred to be secured in good condition.

MINEOLA Hulst.

- M. amplexella** Rag. Newark V (Wdt); Anglesea V, VI (Kf).
- M. juglandis** LeBaron. Burlington and Ocean counties; larva not rare in June, on hickory.
- M. vaccinii** Riley. On cranberry bogs in July. The larva is the "cranberry fruit-worm" and may be found on almost all bogs, its presence being indicated by the premature coloring of the berries. No serious injuries are caused by the species in this State.

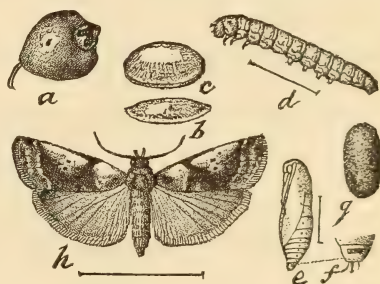


Fig. 227.—Cranberry fruit-worm, *Mineola vaccinii*: a, berry, with egg, natural size; b, c, egg, enlarged; d, larva; e, pupa; h, adult; all enlarged; g, cocoon natural size.

- M. indiginella** Zell. Throughout the State, not rare. The larva is an "apple-leaf crumpler," but also feeds on quince, plum, cherry, etc. It is rarely troublesome now-a-days in well-kept orchards, the sprayings made for the codling moth serving to keep it in check.

DIORYCTRIA Zell.

- D. abietella** S. V. Anglesea VI, 20, and have also seen the larva on pines, Ocean county in early June.

PINIPESTIS Grt.

- P. zimmermanni** Grt. I have seen what I take to be injuries caused by the larva of this insect in Sussex and Warren Counties. It bores in pine, and in some sections of this country is seriously injurious.
- P. spec. indet.** Bred from pine bark, Brown's Mills VIII, 6-20; a species near "albovittella" (Dke).

TACOMA Hulst.

T. nyssæcolella Dyar. Anglesea V, VI (Kf).

NEPHOPTERYX Hbn.

N. ovalis Pack. Newark (Soc).

TLASCALA Hulst.

T. finitella Wlk. Elizabeth VI, 14 (Haim); New Brunswick, Jamesburg (Coll); Brown's Mills V, 30 (Dke).

T. reductella Wlk. Near New York City on the honey locust; *imagoes* V, VI (Bt).

MEROPTERA Grt.

M. pravella Grt. Montclair VI, 13, light (Kf); Anglesea, rare (Bt).

SALEBRIA Zell.

S. afflictella Hulst. Montclair VIII; larvæ in frass-lined tubes between leaves of sweet gum in July (Kf); Elizabeth VII, 10 (Haim).

S. contatella Grt. Essex Co. VI (Kf); larva on locust (Bt).

S. celtidella Hulst. Near New York City; larva on "*Celtis occidentalis*" (Bt).

S. basilaris Zell. Canada to Texas; and sure to occur in New Jersey.

LAODAMIA Rag.

L. fusca Haw. Essex Co. VI, VIII, Montclair VI, VII, at light (Kf); Newark, light V, VIII (Soc); Anglesea, common (Lt); larva on "*vaccinium*."

ELASMOPALPUS Blanch.

E. lignosellus Zell. Newark V (Wdt); Montclair IX, 15, and will be found throughout the State (Kf).

var. *incautellus* Zell. Lucaston IX, X (div); Stone Harbor VIII (Dke).

var. *tartarellus* Zell. Lucaston VIII, 5-mile beach VIII (Haim).

EPISCHNIA Hbn.

E. boisduvaliella Gn. Anglesea V, 30 (Coll).

MELITARA Wlk.

M. prodenialis Wlk. Lahaway, Anglesea; the larva in the leaves of the prickly pear or common cactus, but very local.

ZOPHODIA Hbn.

Z. grossulariæ Pack. Has been recorded from New Jersey without specific locality; larva in gooseberries, causing premature coloring.

EUZOPHERA Zell.

- E. semifuneralis** Wlk. Throughout the State, locally common IV-VIII; larva bores under bark of plum and Mr. Daecke has bred it from cherry.
- E. ochrifrontella** Zell. Montclair IX (Kf); New Brunswick VIII, Anglesea VIII (div).

VITULA Rag.

- V. edmandsii** Pack. Anglesea, common at light (Sm).

LÆTILIA Rag.

- L. coccidivora** Comst. Throughout the State, the larva preying upon the tulip soft scale and cottony maple scale, forming an effective check to the former; all stages may be found all season and the insects may winter as either larva or pupa.

CANARSIA Hulst.

- C. ulmiarrosorella** Clem. Montclair VI, VIII (Kf); New Brunswick VII, VIII; the larva common on elms, and probably throughout the State.

HULSTIA Rag. (HONORA Grt.)

- H. undulatella** Clem. Newark V, 24 (Kf); Anglesea, VI, VII, common at light (div).
- H. hammondi** Riley. Jamesburg, Anglesea V, 30, the larva on leaves of apple.

HOMŒOSOMA Curt.

- H. electellum** Hulst. Anglesea VII, VIII, 24 (div).
- H. stypticellum** Grt. Anglesea VI, 18-VII, 26 (div).
- H. mucidellum** Rag. Brown's Mills IX, 6 (Dke); Anglesea VII, 24 (Sm).

EPHESTIODES Rag.

- E. infimella** Rag. Montclair and Anglesea VI, VIII-IX (Kf).

EPHESTIA Gn.

- E. kuehniella** Zell. The "Mediterranean flour moth"; from scattered localities throughout the State. Infests dried fruits and other products, webbing them up with its silken tubes; not yet seriously troublesome.
- E. elutella** Hbn. "Found in all parts of the world, living in old fences, decaying wood and rubbish" (Hulst).

PLODIA Gn.

- P. interpunctella** Hbn. The "meal moth"; common throughout the State in houses; the larva lives on meal, flour, dried fruits, etc., and the adult is often mistaken for one of the common clothes moths.

Sub-family ANERASTINÆ.

PEORIA Rag.

P. approximella Wlk. (*hæmatica* Zell.) Newark IV and VI (Wdt); g. d. (Kf).

Family PTEROPHORIDÆ.

This family contains the species commonly known as "plume moths," because the wings are split up into from two to five plumes or feathers, which make the species recognizable at a glance. The moths are all small in size, usually with disproportionately long legs and altogether frail in structure. The caterpillars are hairy and at first sight some of them resemble miniature Arctiids, but they spin up leaves or make tubes and differ in other essential characters of structure.

The species are not usually common and are best or only obtainable by breeding. They are therefore not well represented in collections as a rule.

TRICHOPTILUS Wism.

T. lobidactylus Fitch. Essex Co. VII, in fields, not rare (Kf); larva on golden rod, "*Solidago canadensis*."

T. ochrodactylus Fish. Wenonah V, 30 (Dke); 5-mile beach VII, 4 (Haim).

OXYPTILUS Zell.

O. periscelidactylus Fitch. The "Grape Plume" moth; common throughout the State, the larva webbing up the tips of the vines in early spring. They do no real injury in most cases because as a rule they spin up the tip beyond the blossom cluster.

O. delawaricus Zell. Mass. to California, and sure to occur in New Jersey.

O. tenuidactylus Fitch. Ft. Lee VII, 4 (Dke); Essex Co. VI, 20-VII, 7, not rare in open woods and at light (Kf); 5-mile beach VII, 4 (Haim).

PLATYPTILIA Hbn.

P. acanthodactyla Hbn. Essex Co. V-VII and IX, common (Kf).

P. marginidactyla Fitch. Essex Co., VI, VII, abundant (Kf); food plant yarrow, "*Achillea millefolium*" (Bt).



Fig. 228.—The grape plume, *Oxyptilus periscelidactylus*: a, larva in web; b, pupa; c, its "breast-bone," enlarged; d, moth; e, segment of larva, enlarged.

PTEROPHORUS Geoff.

- P. homodactylus* Wlk. Jersey City Hts. VI, 7 (Sb); Essex Co. VI (Kf).
P. elliottii Fern. Newark VII, 2 (Wdt); larva on "Epilobium" (Dyar).
P. subochraceus Wlsm. Greenwood Lake, Essex Co. VI (Kf); Elizabeth VI, 4 (Wdt); Anglesea VI, 20 (Sm).
P. carduidactylus Riley. Essex Co. VIII (Kf); larva on thistle.
P. sulphureodactylus Pack. Essex Co. VIII, IX, at light (Kf).
P. paleaceus Zell. Very abundant in open woods and at light, Essex Co. and Anglesea V-VII; larva common on leaves of "Eupatorium" (Kf); Hemlock Falls, Newark VIII (Wdt); Ft. Lee VII, Riverton VIII, Iona V (Dke); 5-mile beach VI, 18-VIII, 2 (Haim).
P. kellicottii Fish. Anglesea V, 28, VII, 29, IX, 5 (div); larva on golden rod.
P. monodactylus Linn. Essex Co. VII, 7 (Kf); Hemlock Falls VIII, 27 (Wdt); Anglesea VII, VIII (Haim); larva on "Convolvulus," "Chenopodium" and "Atriplex."
P. eupatorii Fern. Essex Co. VII, 1-5 (Kf); larva on "Epilobium" and "Eupatorium."

Family TORTRICIDÆ.

The Tortricids or "bell-moths" are usually small or moderate sized species with broad, squarely-terminated primaries, the costa of which is usually strongly arched toward the base. The moths are variegated in color, but usually brown gray or golden rather than of brighter hues. The secondaries are usually of the body color and without markings.

Some of the larvæ are leaf-rollers, but the majority are stem and root borers, living and feeding in concealment, more or less sheltered from either contact or stomach poisons, and that makes them difficult to deal with.

Some of them feed in seeds and growing fruits, the most notable example being found in the Codling Moth, which infests apple and pear, while other species infest grape and a variety of small fruits.

Sub-family OLETHREUTINÆ.

RHYACIONIA Hbn. (RETINIA Gn.)

All the species of this genus feed in the shoots or bark of pine, but seldom in sufficient numbers to be troublesome. The larvæ all winter in the shoots or in the exuding resin masses and are beyond reach of insecticides. Remedial measures therefore, when such are indicated, are mechanical and mean hand-picking, pruning or similar methods, the cuttings being burnt in all cases.

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- R. frustrana** Scudd. Jamesburg; larvæ bore into the terminal shoots of pitch pine, dwarfing the vertical and lateral shoots (Kf); Westville IV (Kp); Riverton IV, Ocean Co. V (Sm); Lacy VII (Dke).
- R. wenzeli** Kearf. Gloucester Co.; larvæ winter in slender shoots of "Pinus virginianus," the exudation of pitch forming a complete cylinder around the stem; imagoes in early May (Kf).
- R. comstockiana** Fern. Montclair, Anglesea, larvæ winter in masses of pitch on young branches of pine, moths VI (Kf); Forked River Mts. V, 27, Brown's Mills V, 30 (Dke).

The "*R. turionana*" Hbn. is a European species which, it seems now, does not occur in America at all.

BACTRA Steph.

- B. furfurana** Haw. 5-mile beach VII, 2 (Haim); has not been bred in America; in Europe the larva lives in stems of grasses, "*Juncus*" and "*Eleocharis*."

POLYCHROSIS Rag. (EUDEMIS Hbn.)

- P. viteana** Clem. (*botrana* Schiff.) The "grape berry moth," which sometimes causes trouble locally throughout New Jersey. It occurs on my own grounds at New Brunswick, and I have seen it often in other sections. There are three broods; the first in May, destroying the entire clusters; the second late in July, boring into and webbing up the half-grown berries; the third in late August, destroying the nearly full-grown berries. Spraying with arsenate of lead to kill off the first brood is indicated.
- P. slingerlandana** Kearf. Essex Co. and doubtless all over the State VII, VIII; larva in flower and seed heads of "*Eupatorium perfoliatum*."
- P. vernoniana** Kearf. Caldwell VIII, larva on flower and seed heads of "*Vernonia noveboracensis*," and probably abundant where its food plant occurs (Kf).
- P. liriiodendrana** Kearf. Fairly abundant wherever the tulip tree is found, July and September; larva in tents on under surface of leaves.
- P. magnoliana** Kearf. Moorestown, Lacy, and will be found wherever the swamp magnolia occurs; larva under silken tents on underside of leaves VII (Kf).

CYMOLOMIA Led. (EXARTEMA Clem.)

The larvæ of these species are all leaf crumplers or tyers occurring in May and June, the adults from mid June to mid July. There is only one brood and the species are g. d., wherever the food plant occurs.

- C. exoleta** Zell. Montclair (Kf); New Brunswick; larva on gooseberry.
- C. corylana** Fern. Greenwood Lake VI (Kf); larva on hazel.

- C. inornatana* Clem. Hemlock Falls VIII, Woodside VII (Wdt); New Brunswick (Sm); larvæ crumpling wild cherry leaves V, adults VI (Kf).
- C. ornatana* Kearf. Essex Co., in July (Kf).
- C. concinnana* Clem. Essex Co. VI, VII (Kf); Newbold VII, 4 (Dke); Gloucester Co. VI, 21; 5-mile beach VI, 18 (Haim).
- C. versicolorana* Clem. Greenwood Lake, Essex Co. VII; larva crumpling leaves of chestnut oak V, and probably common throughout the State.
- C. fasciatana* Clem. More or less common throughout the State IV-VII; larva on "Rumex."
- C. zelleriana* Fern. Orange Mts. VIII (Wdt); Essex Co. VII, larvæ crumpling young leaves of birch V (Kf).
- C. permundana* Clem. Jersey City Hts. VI (Sb); Orange Mts. VIII (Kp); Newark, light VII, Jamesburg (Sm); Glassboro VII (Dke).
- C. gaylussaciana* Kearf. Essex Co. VI, larva V, crumpling leaves of huckleberry; abundant (Kf).
- C. myricana* Kearf. Essex Co. VI; larva crumpling leaves of "Myrica" (Kf).
- C. nortana* Kearf. Essex Co. VII, 1 (Kf).
- C. sericorana* Wlsm. Clementon VI, 28, Lacy VII, 8 (Kf).

OLETHREUTES Hbn.

The species of this genus come freely to light and are abundant during the day in open woods or roads bordered with shrubbery. Larvæ are leaf folders, twistors or feeders in flower or seed heads and in the stalks of perennial plants. They are under the generic terms "Penthina" and "Sericoris" in last edition.

- O. coruscana* Clem. Essex Co. VI, Lacy VII (Kf); Newark, Jamesburg VI (Coll); Westville V, 23 (Kp); Brown's Mills VI, VII (Dke); common.
- O. constellatana* Zell. Hemlock Falls VI (Wdt); So. Orange VI (Sb); Jamesburg VI, Riverton V (Coll); Wenonah V, Brown's Mills VII (Dke).
- O. niveiguttana* Grt. Anglesea V, VII, 29; larva on sassafras and witch-hazel (Dke).
- O. impudens* Wlsm. Essex Co. VIII (Kf); Clementon V (Coll); Wenonah V, 30 (Haim); Anglesea V, VIII (div).
- O. nimbatana* Clem. Newark, New Brunswick (Coll); 5-mile beach VI, 18 (Haim); the larva on rose.
- O. separatana* Kearf. Essex Co. VI; larva on thorn (Kf).
- O. bipartitana* Clem. Greenwood Lake VI, 10 (Kf); Woodside VI, 3 (Wdt); Wenonah V, 30 (Dke).
- O. flavofasciana* Westw. (*instrutana* Clem.) Throughout the State V-VII; abundant everywhere, larva on clover and horse chestnut (Kf).
- O. campestrana* Zell. Newark VI (div); Hammonton VI (Sm); Iona VI (Dke); the larva on "Rubus."

- O. fuscalbana* Zell. Riverton V, 30 (Coll).
O. agilana Clem. Essex Co., Anglesea V, VI; larva on "Impatiens" (Kf); Holly Beach V, 27, VIII, 2 (Haim).
O. albicilliana Fern. Merchantville VI, National Park V, Anglesea V, 28 (Dke).
O. daeckeaana Kearf. Brown's Mills, Toms River, Lacy, Lakehurst, Iona VII; larvæ VI in stalks and leaf stems of pitcher plant, "Sarracenia" (Dke); Holly Beach VIII, 2 (Haim).
O. auricapitana Wlsm. Essex Co., Anglesea VI, VII (Kf).
O. cyanana Murtf. Greenwood Lake, Caldwell, Montclair, Anglesea V, VI, rare, larva in shoots of rose (Kf); 5-mile beach VII, VIII, 6 (Haim).
O. hebesana Wlk. Common throughout the State VI, VIII, IX; larva in seed stalks of Mullein, on "Gerardia," "Verbena," in seed pods of "Tigridia," "Iris," and doubtless many other plants (Kf).
O. interruptolineana Fern. Essex Co. VII, VIII; larva binding leaves of huckleberry (Kf).
O. osmundana Fern. Essex Co. VII, 8, rare, larva on "Osmunda regalis" and in seeds of "Ambrosia trifida" (Kf); Wenonah VI, 14 (Dke).
O. hemidesma Zell. Essex Co., larva binding together leaves and making galleries in flower spikes of "Spiræa tomentosa" VII, IX (Kf).
O. chionosema Zell. Essex Co., twisting leaves of apple (Kf); New Brunswick.
O. albeolana Zell. Essex Co., larva crumpling leaves of birch V, VII (Kf).
O. nubilana Clem. Will be found in the Appalâchian region of New Jersey (Kf).

PHÆCASIOPHORA Grt.

- P. confixana* Wlk. Caldwell, Montclair V, VII (Kf); National Park VI, 3, Lucaston V, 30 (Dke).

PSEUDOGALLERIA Rag.

- P. inimicella* Zell. Elizabeth VI, 26, larva in stems of cat-briar, "Smilax" sp.

EUCOSMA Hbn. (PÆDISCA Tr.)

The species of this genus come freely to light and are easily disturbed during the day. There is probably only a single brood, those that emerge in fall hibernating as adults and becoming evident again in spring. The larvæ are internal feeders, principally in shoots, stems and roots, occasionally in galls and sometimes in seed and flower heads.

- E. quinque maculana* Rob. Mt. Holly VIII, IX, Lucaston IX (Dke); Anglesea V (Coll).
E. robinsoniana Grt. Montclair VII, 1 (Kf); Jamesburg VII, 4 (Sm); Brown's Mills VII, 5 (Dke); 5-mile beach VI-VIII (div).

- E. adamantana* Gn. Lucaston, Iona, DaCosta IX, 6-19 (Dke).
E. mandana Kearf. Montclair, VII, light (Kf).
E. ridingsana Rob. Wenonah VII, 21 (Haim).
E. fulminana Wlsm. Anglesea (Coll).
E. sombreana Kearf. Newark VIII (Bwl); Montclair VIII, 4, at light (Kf).
E. albiguttana Zell. Essex Co. VI-VIII, Lacy VII, 1 (Kf); Wenonah VII, 15-28 (div).
E. cataclystiana Wlk. Throughout the State VI-IX, common everywhere; larva feeds in rag-weed.
E. circulana Hbn. Essex Co. VIII, 15 (Kf); Brown's Mills VII, 21 (Dke).
E. pergandeana Fern. Essex Co. VI, common in swampy meadows just before sunset (Kf); 5-mile beach VI, 28 (Haim).
E. boxcana Kearf. Caldwell V, 17 (Kf).
E. tomonana Kearf. Essex Co. VIII, IX at light (Kf).
E. tandana Kearf. Montclair VI, 20 at light (Kf).
E. abruptana Zell. Anglesea VI, 22, VIII, 10 (div).
E. perplexana Fern. Essex Co., Anglesea VI-VIII (Kf).
E. constrictana Zell. Essex Co. VI-VIII (Kf); Anglesea VII, VIII (div).
E. strenuana Wlk. Throughout the State, common V-VIII; larva in stems of "Ambrosia trifida," making slender, spindle-shaped galls (Kf).
E. minutana Kearf. Essex Co. V, Anglesea VI, probably throughout the State; larvæ doubtless in stalks of aster or similar plants (Kf).
E. otiosana Clem. Anglesea VI-IX (div); common everywhere, larva in stems of "Bidens frondosa"—beggar ticks.
E. suffusana Zell. Montclair; an European species only recently observed in this country; larva in flower buds and young leaves of cultivated rose, and may become a serious pest. Best preventive in small gardens is to pinch off and crush the tips of all infested shoots (Kf); Newark VI (Bwl).
E. transmissiana Wlk. Essex Co. VI, VII (Kf); Jamesburg VII, 4 (Haim).
E. solicitana Wlk. Essex Co. V (Kf).
E. abbreviatana Wlsm. Common in woods of Northern New Jersey in very early spring (Kf).
E. gomonana Kearf. Essex and Passaic Co. IV, V (Kf).
E. zomonana Kearf. Essex Co. V, IX (Kf); Bridgeport V, 20, Anglesea VI (Haim).
E. junciciliana Wlsm. Essex Co. VII, VIII; larva in stems of Solidago (Kf).
E. dorsisignatana Clem. Throughout the State IX; usually common; larva in roots of Solidago.
E. confluana Kearf. Essex Co. VIII, 24-IX, 5, not common (Kf).

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- E. diffusana* Kearf. Essex Co. IX, 16, not common (Kf); Newark IX, 19 (Wdt).
- E. engelana* Kearf. Essex Co. V (Kf).
- E. carolina* Wlsm. Montclair VIII, 2, very rare (Kf).
- E. giganteana* Riley. "New Jersey," Coll. Hulst.
- E. nisella* Clerck. Staten Island, bred from larva in willow catkins (Ds).
- E. illotana* Wlsm. This species, described from Oregon, is rapidly working east, has already been recorded from Penn. and Mass., and is certain to occur in New Jersey (Kf).
- E. scudderiana* Clem. Throughout the State VI-VIII, not rare; the larva makes a stem gall on goldenrod.
- E. desertana* Zell. Essex Co. VI (Kf); Newark VI (Bwl); Anglesea V, VI (div); larva makes galls on stem of goldenrod (Kf).
- E. obfusca* Riley. Ft. Lee district (Dow); larval habit probably like that of the preceding (Kf).
- E. tripartitana* Zell. Essex Co. V (Kf); Staten Island (Ds); the larva is an inquiline in Cecidomyid galls on "Rudbeckia" (Ds).
- "*E. argentialbana*" Wlsm. has not yet been found in New Jersey; "*E. basipunctata*" Wlsm. of the last edition was wrongly identified, and "*E. similana*" Hbn. does not occur in North America at all, so Mr. Kearfott says.

CYDIA Hbn. (SEMASIA Steph.)

- C. radiatana* Wlsm. Essex Co. V (Kf); Wenonah V, 30 (Haim).
- C. essexana* Kearf. Caldwell and northern New Jersey V, VI; larva dwarf the main stalk of "*Aster patens*," by boring into it from the top, living in this cell until early spring, when they drop to the ground to pupate (Kf).
- C. ferruginana* Fern. Orange Mts. V, VI, g. d. (Kf); Newark (Sb); Clementon V (Kp).
- C. formosana* Clem. Hemlock Falls V, Orange Mts. V, VI (Wdt); g. d. (Kf); Jersey City Hts. V, Newark VI (Sb); Lahaway V, 20 (Sm).
- C. kiscana* Kearf. Greenwood Lake VI (Kf); Gloucester Co. V (Haim).
- C. raracana* Kearf. Essex Co. VIII (Kf).
- C. olivaceana* Riley. Essex Co. VI, VII (Kf); Wenonah VII, 28 (Haim); Glassboro VII, 9 (Dke); 5-mile beach VI, VII, IX (div).
- C. striatana* Clem. Orange Mts. V (Kp); Newark at light VIII (Wdt); abundant and generally distributed (Kf).
- C. imbridana* Fern. Essex Co. VII, VIII, g. d. (Kf); 5-mile beach VIII, IX (div).
- C. ochroterminana* Kearf. Essex Co. VIII (Kf).
- C. annetteana* Kearf. Hammonton IX, 6 (Kf).
- C. refusana* Wlk. Hemlock Falls V, 13 (Wdt); Essex Co. IV, 21, rare (Kf); Manumuskin V, 5 (Dke).

- C. signatana* Clem. Abundant in North Jersey VI; larva in tube of frass and silk protected by a web, on underside of red maple leaves VIII, IX (Kf).
- C. timidella* Clem. Essex Co., Anglesea V; larva in tube beneath web of silk on underside of oak leaves, VIII, IX (Kf).
- C. perstructana* Wlk. Essex Co. V, 10, rare (Kf).

EPISIMUS Wlsm.

- E. argutus* Clem. National Park VI, 3 (Dke); 5-mile beach VII, 23 (Haim); larva twists leaflets of sumac into a spiral tube; also feeds on hazel, goldenrod and many other plants. g. d.

EXENTERA Grt.

- E. apriliana* Grt. Clementon V, 7, 5-mile beach VI, 19 (Haim).

PROTEOTERAS Riley.

- P. æsculanum* Riley. Montclair VII, 18, larva in stems of horse chestnut leaves (Kf).
- P. moffatiana* Fern. Montclair VI, 27; larva on maple, boring in leaf stems or feeding on leaves (Kf).
- P. willingana* Kearf. Canada and D. C., larva in leaf-stems of box-elder, forming a slight swelling or gall; not yet found in New Jersey (Kf).

GYPSONOMA Meyr.

- G. dealbana* Froel. Essex Co. VI, 27-VII, 7 (Kf).
- G. fasciolana* Clem. (*Steganoptycha*) Newark VI, 10 (W), and will be found g. d. though not common (Kf).

ENARMONIA Hbn. (EPINOTIA, STEGANOPTYCHA.)

- E. crispana* Clem. Essex Co. VIII, IX, not rare, g. d. (Kf).
- E. piceafoliana* Kearf. Montclair; larvæ are miners in spruce needles, moths issue late May and early June, and are common about infested trees (Kf).
- E. ratzeburgiana* Saxl. Larva in spruce needles; not yet reported from New Jersey, but will certainly be found in the northern district (Kf).
- E. watchungana* Kearf. Abundant in North Jersey, end IV, early V, usually resting on tree trunks; Gloucester Co. IV, 30 (Haim).
- E. septemberana* Kearf. Essex Co. Park, not rare locally, end IX (Kf).

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- E. virginiana* Clem. Certain to occur in North Jersey III and IV (Kf).
- E. costomaculana* Clem. Essex Co. V (Kf).
- E. cressonana* Clem. Essex Co., in April, flying with "spoliana," of which it may prove to be a variety (Kf).
- E. resuptana* Wlk. Essex Co. V, 1 (Kf).
- E. spoliana* Clem. (*Proteopteryx*) Throughout the State IV, V; very abundant in second growth woods before the leaves have unfolded, sometimes flying in multitudes at every step and settling in the brush or on the bare twigs (Kf).
- E. pyricolana* Murtf. Essex Co. V-VII; larva in rosebuds (Kf).
- E. saliciana* Clem. Essex Co., Anglesea VI, VII; larva locally abundant, crumpling leaves of willow in early spring (Kf).
- E. salicicolana* Clem. Closely related to the preceding and will be found with it (Kf).

EUDEMIS Hbn.

- E. deludana* Clem. Essex Co. V, abundant on tree trunks (Kf); Bamber VIII, 3 (Dke).
- E. bolliana* Sling. Not uncommon, g. d.; larvæ in terminal twigs of Pecan and allied trees; moths usually found on tree trunks IX-XI (Kf).
- E. ilicifoliana* Kearf. Essex Co. Park, VI, local; larvæ crumple young leaves of "Ilex."
- E. haimbachiana* Kearf. Riverton (Dke).

ANCYLIS Hbn. (PHOXOPTERIS Tr.)

- A. nubeculana* Clem. Throughout the State V-VII, larva on apple.
- A. subæquana* Zell. Greenwood Lake, Essex Co. VI, not common (Kf); Lucaston VI, 27 (Dke).
- A. semiovana* Zell. Orange Mts. VIII (Wdt); Essex Co. VI, 10 (Kf); Jamesburg VII, 4 (Haim); Wenonah VII, 15 (Dke).
- A. spiræfoliana* Clem. Anglesea V, 30 (Kf); larva on "Spiræa" (Bt).
- A. pulchellana* Clem. Essex Co. V, 15-VI, 10, abundant in woods (Kf).
- A. burgessiana* Zell. Greenwood Lake, Essex Co. V, VI (Kf); Newark VI (Wdt); South River V, Clementon VI (Coll); National Park VI, Malaga VI (Dke); Wenonah V (Haim).
- A. dubiana* Clem. Essex Co. V, VI (Kf); Lacy V (Dke); Wenonah V (Haim).
- A. laciniana* Zell. Ft. Lee Dist. (Dow); flies with "dubiana" and may be a variety or synonym of it (Kf).
- A. amblygona* Zell. National Park V, 6 (Dke); Wenonah V, 30, 5-mile beach VII, 23 (Haim).

- A. comptana* Froehl. Throughout the State, locally common, V and VII, more abundant southwardly. The larva is the strawberry leaf roller

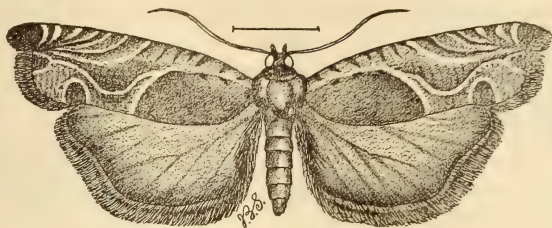


Fig. 229.—Strawberry leaf-roller, *Ancyliis comptana*: enlarged.

which is seasonally and locally destructive; attacks also blackberry and raspberry, but does no injury on these. Arsenate of lead, thoroughly applied as soon as the adults are noticed about the plants, serves as a remedy.

- A. angulifasciana* Zell. 5-mile beach VI, 28 (Haim).
A. kincaidiana Fern. Greenwood Lake VI, 10, Caldwell V, 17 (Kf).
A. platanana Clem. New Brunswick V, Jamesburg VI, 10; larva makes tent between two veins on the underside of sycamore leaf.

ANCYLOPERA Steph. (PHOXOPTERIS, part.)

- A. mediofasciana* Clem. Will be found in the Appalachian region V, VI (Kf).
A. cornifolia Riley. (Phoxopteris) New Brunswick, Lakehurst VII; rare.
A. muricana Wlsm. Essex Co. V, VIII, larva on blackberry leaves (Kf); Merchantville V, 25 (Dke); 5-mile beach VI, 17 (Haim).
A. divisana Wlk. Essex Co. V, VIII, larva on oak (Kf); Malaga VI, 1 (Dke).
A. goodelliana Fern. Hemlock Falls V (Wdt); Essex Co. V (Kf).
A. diminutana Kearf. Essex Co. V, VII; larva folding leaves of willow (Kf).

LASPEYRESIA Hbn. (ENARMONIA, part.)

- L. caryana* Fitch. (Grapholitha) Ocean County, not common; the larva on hulls of hickory and walnut.
L. prunivora Walsh. Will be found wherever "Cratægus" grows; larvæ in the "thorn apples" (Kf).
L. shawiana Kearf. Essex Co. Park VII, 1-17 (Kf); Newark VI, 9 (Wdt).
L. interstictana Clem. Throughout the State V, VI; larva on leguminous plants.
L. angleseana Kearf. Lucaston VI, Brown's Mills V, 30 (Dke); Anglesea V, VI, VIII, very abundant at times (div).
L. fana Kearf. Essex Co. V, 15, larvæ in flower heads or terminal buds of tick trefoil, "Meibomia" (Kf); Anglesea V, 28, VIII, 5 (div).

- L. eclipsana* Zell. Brown's Mills V, 12-21 (Dke).
L. lautana Clem. Essex Co. Park III, 23-V, 20; not uncommon, but generally overlooked, as it is one of the first species to appear in spring (Kf).
L. packardii Zell. Essex Co. V, 17 (Dke).
L. dana Kearf. Essex Co. V, 17-24 (Kf).
L. nigricana Steph. Essex Co. VIII, 20; there is also an earlier brood in May; in some parts of the country the larva is a serious pest on cultivated peas, living in the pods and eating the young peas (Kf); Malaga VI, 1 (Dke).
L. dandana Kearf. Essex Co. VIII, light (Kf).
L. tristrigana Clem. Throughout the State V-VII; not rare.
L. walsinghami Kearf. Essex and Passaic Co. IV, V (Kf).

HEMIMENE Hbn.

- H. simulana* Clem. (*Dichrorahpha*) Essex Co., g. d. VI, 10-VII, 4, very common in open woods at Anglesea V, VI (Kf); Wenonah V, 30 (Haim).
H. nigromaculana Kearf. Essex Co. Park VI, 18 (Kf).

ECDYTOLOPHA Zell.

- E. insiticihana* Zell. Essex Co., g. d. V, VI; larva makes gall-like swellings in twigs and young shoots of common locust, remains during winter, pupates in ground in spring; DaCosta VIII, 3 (Dke).

GYMNANDROSANA Dyar.

- G. punctidiscanum* Dyar. Newark VI, 11 (Wdt); rare but g. d. (Kf); Forest Hill IX (Bwl).

MELLISOPUS Riley.

- M. latiferreana* Wlsm. Newark VIII, light. Larva in fallen acorns (Kf).

CARPOCAPSA Tr.

- C. pomonella* Linn. The "Codling moth," common throughout the State; in May north of Piedmont Plain, May and August south of that point; the larva is the common apple worm and often seriously injurious. Spray with arsenites after fruit is fully set, while it is yet upright and while the lobes of calyx cup are yet open.

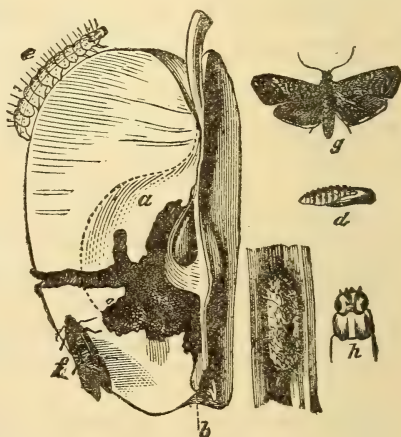


Fig. 230.—Codling moth, *Carpocapsa pomonella*: a, injury to apple; b, place where egg is laid; c, larva; d, f, g, adults; h, head of larva; i, cocoon.

RHOPOBOTA Led.

R. vacciniana Pack. Throughout South Jersey on cranberry bogs. The larva is the "vine worm" or "black-head," which is always injurious and often ruinous; there are two broods, and the winter is passed in the egg stage. Reflowing is the best method of control; arsenites are useful if applied early; late holding of water answers on a level, shallow bog.



Fig. 231. — *Rhopobota vacciniana* enlarged.

SPILONOTA Steph. (TMETOCERA Led.)

S. ocellana Schiff. The "bud-moth"; occurs throughout the State. The larva is known as the "bud worm" of apple and other fruit trees, destroying fruit and buds in early spring.

var. *lariciana* Hein. Occasional with the type; differs in having the whitish median fascia almost obscured by the general brown color (Kf).

PHTHINOLOPHUS Dyar.

P. indentanus Dyar. Essex Co. VII (Kf); Stone Harbor VIII (Dke); 5-mile beach VI-VIII (div); larva webs leaves of huckleberry and bayberry (Kf).

Sub-family TORTRICINÆ.

PERONEA Curt. (TERAS Tr. ACLERIS Hb.)

P. maculidorsana Clem. (*hastiana* Linn., part.) Throughout the State, fall and spring. Moths hibernate and can be disturbed on mild days of winter and early spring; larva on willow and apple (Kf).

P. brewsteriana Rob. Essex Co. X, 10 to VI, 2 (Kf).

P. pulverosana Rob. Essex Co. X, 1 (Kf).

P. effractana Froel. (*scabrana* Curt.) Jersey City; Woodside VII (Wdt).

P. minuta Rob. Throughout the State and throughout most of the year. Larva on apple in general, and on huckleberry and allied plants. In the cranberry regions it attacks that plant by preference, and is the "fire-worm" or "yellow-head" of the cranberry grower. There are three broods, that issuing in fall being gray and forming the variety "cinderella" Riley. This hibernates and in spring lays eggs for the summer broods, which are orange. The remedial measures are reflowing, when the larvæ first appear, late holding of water to compel the hibernating moths to oviposit elsewhere, and the use of arsenites.

P. oxycoccana Pack. Also a cranberry feeder and may be a large form of the preceding.



Fig. 232. — Fire-worm, *Peronea minuta*: enlarged.

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- P. ferrugana** Schiff. Throughout the State; larva on birch, moths issue IX to XI, hibernate and worn specimens occur IV and V (Kf).
- P. commandrana** Fern. Essex Co. VI and XI (Kf).
- P. viburnana** Clem. Abundant, Essex Co., late fall and early spring; larvæ VIII, IX, crumpling leaves of *Viburnum* (Kf); Gloucester Co. VI (Haim).
- P. americana** Fern. Woodside VIII (Wdt); Wenonah VII (Haim); Malaga VII (Dke).
- P. trisignana** Rob. Essex Co. IX, X, abundant, larva crumpling leaves of birch VIII (Kf).
var. *placidana* Rob. With the type and equally common (Kf).
- P. deflectana** Rob. Anglesea V, 30, larva on oak, adult VI, 15 (Kf).
"P. permutana" Dup. and "P. subnivana" Wlk. are not yet taken.

EPAGOGE Hbn.

- E. sulphurana** Linn. (*Dichelia sulfureana* Clem.) Throughout the State, all season; larva on grape, willow, strawberry and many other plants.
- E. demissana** Wlsm. Larva folding lower leaves of "Solidago" sp., Anglesea VI, 21, adult VII (Kf); Cape May VI (Haim); Stone Harbor VIII (Dke).

CENOPIIS Hbn.

- C. reticulatana** Clem. Throughout the State VI-IX, common; larva on rose, geranium, oak, persimmon, pear, maple, &c.
- C. pettitana** Rob. Brown's Mills VI, 25, Lacy VII, 22 (Dke).
- C. saracana** Kearf. Essex Co. VII, larva crumpling leaves of sassafras (Kf).
- C. karacana** Kearf. Larvæ roll oak leaves, V, VI, adults VII, VIII, Essex Co., Lacy, also from Bayberry, Anglesea (Kf); Brown's Mills VI (Kf).
- C. diluticostana** Wlsm. Essex Co. VII, 8 (Kf); 5-mile beach VII, 26 (Haim).
- C. testulana** Zell. Essex Co. VII, IX, not common; larva sews together leaves of wild cherry (Kf).
- C. furcatana** Wlk. (*Capua*) Orange VIII, 16 (Kp).
"C. cana" Rob. has not yet been found in the State.

CŒLOSTATHMA Clem. (AMPHISA Curt.)

- C. discopunctana** Clem. Ft. Lee Dist. (Dow); Essex Co. V-VIII (div); g. d., larva on "Solidago" (Kf); 5-mile beach VII, VIII (div).

SPARGANOTHIS Hbn.

- S. xanthoides** Wlk. (*Œnecetra*) Essex Co. VII, g. d. (Kf).
- S. inconditana** Wlsm. Essex Co. (Kf).

S. irrorea Rob. Essex Co., g. d. VII (Kf); Holly Beach VIII (Haim).

S. tristriana Kearf. Bamber VIII, 11 (Dke).

"*Cnecetra unifasciana*" has not yet been found in the State.

ARCHIPS Hbn. (CACÆCIA Hbn.)

A. rosaceana Harr. Throughout the State, common; larva on orchard and small fruits and roses; often troublesome in gardens, where it can be controlled by hand-picking or by using arsenites.

A. purpurana Clem. Throughout the State VII, VIII; larva on oak, huckleberry, locust, geranium and many other plants.

A. rosana Linn. Throughout the State, not common, chiefly in gardens; larva on currant and other small fruits, orchard and shade trees.

A. cerasivorana Fitch. G. d., not rare; larva on cherry and white birch; Lacy VII, 14 (Dke).

A. parallela Rob. Burlington Co., on cranberry (Sm); 5-mile beach VI (Haim); also occurs on pitcher plant (F. M. Jones).

A. argyrospila Wlk. Throughout the State VI, VII; a general feeder.

A. semiferana Wlk. Burlington Co., larva on "Polygonum."

A. negundana Dyar. 5-mile beach VI, 28-VII, 2 (Haim).

A. fervidana Clem. Throughout the State, locally common VII, VIII; larva makes nests on oak and cherry, sometimes webbing up entire scrub trees or bushes, and containing thousands of larvæ.

A. dissitana Grt. Philadelphia (Haim), very rare, but will doubtless be found across the river (Kf).

A. fractivittana Clem. Essex Co. VI, 3 (Kf).

A. afflictana Wlk. (*Loxotænia*) Essex Co. V, VI (Kf); Ocean Co. (Sm); larva on spruce.

A. virescana Clem. Essex Co. VI, VII, g. d., not rare (Kf); South River VI (Coll).

A. clemensiana Fern. Newark at light VI, IX (Wdt); common everywhere (Kf).

A. persicana Fitch. (*Ptycholoma*) Plainfield; g. d., larva on strawberry and peach.

A. biustulana Steph. (*melaleucana* Wlk.) Essex Co. Park VI, locally abundant (Kf); Wenonah V, 24 (Haim); Lucaston VI, 14 (Dke); larva on "Trillium."

A. obsoletana Wlk. Brown's Mills VII, 1 (Dke).

PLATYNOTA Clem.

P. flavedana Clem. Throughout the State IV-VI, VIII, IX; general feeder.

P. idæusalis Walk. (*sentana* Clem.) Throughout the State, V, VI, VIII, and also a general feeder.

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PANDEMIS Hbn.

- P. limitata* Rob. Not uncommon in northern part of State, VI; larva on oak, Solidago, birch, rose, hazel and other plants (Kf).
P. lamprosana Rob. Essex Co. VI, 14, VIII, 28 (Kf).

TORTRIX Linn.

- T. pallorana* Rob. Hopatcong (Bt); Orange Mts. VI-VIII, larva on cherry, verbenia and other plants (Kf); Laurel Springs VI (Dke).
T. lata Rob. Essex Co. VIII (Kf).
T. nervosana Kearf. Essex Co. VI (Kf).
T. houstonana Grt. Anglesea, the larva on cedar (Lt).
T. quercifolia Fitch. Essex Co. VI (Kf); Newark, larva on oak; Da-Costa VII, Brown's Mills VI, Lacy VII (Dke).
T. platanana Kearf. Essex Co. VI, 17, larva on sycamore (Kf).
T. albicomana Clem. Throughout the State V and VII, common; larva on oak, rose, huckleberry, etc.; the three varieties "curvalana" K., "dorsipurpurana" K., and "semipurpurana" K., occur in scarcely less abundance.
T. peritana Clem. Abundant everywhere V-X (Kf).
T. fumiferana Clem. Orange Mts., Newark; larva on spruce (Sm); Gloucester Co. V, 7 (Haim); Brown's Mills VII, 21 (Dke).
The record of "*T. alleniana*" Fern. is erroneous.

EULIA Hbn. (LOPHODERUS Steph.)

- E. juglandana* Fern. Ocean Co., not rare (Sm); VII, VIII, the larva crumpling leaves of hickory and Viburnum.
E. quadrifasciana Fern. Essex Co. VI, 25, VII, 1 (Kf).
E. pinatubana Kearf. (*politana* Haw.) Essex Co. IV, V (Kf); Monmouth Co. VI (Sm); larvæ cement together the needles of white pine, forming a tube, and feeding on the outer ends (Kf).
E. triferana Wlk. Common everywhere in early spring, larva on huckleberry, dogbane and many other plants.
E. velutinana Wlk. Throughout the State IV-VI, VIII, IX; larva on sycamore, Solidago and many other plants (Kf).
E. mariana Fern. Ramapo, N. Y., V, 1, and will be found in the Appalachian of N. J.; bred from "*Vaccinium*" (Kf).
E. alisellana Rob. (*Tortrix*) Newark.

AMORBIA Clem.

- A. humerosana* Clem. Essex Co. VI (Kf); Newark VI (Wdt); New Brunswick, Jamesburg, larva on pine, maple, "Rhus," huckleberry, etc.

Sub-family PHALONIINÆ.

PHALONIA Hbn. (CONCHYLIS Tr.)

- P. biscana* Kearf. Essex Co. VII-IX (Kf).
P. giscana Kearf. Essex Co. VII-IX (Kf).
P. atomosana Bsk. Essex Co. VIII, IX (Kf).
P. dorsimaculana Rob. Common throughout the State VI-IX.
P. promptana Rob. Atlantic County.
P. louisiana Bsk. Will be found in the Appalachian region (Kf).
P. angulatana Rob. Essex Co. VI, 27 to VII, 17 (Kf).
P. rana Bsk. Essex County IX, 18 (Kf).
P. labeculana Rob. Essex County VI, VII (Kf).
P. argentilimitana Rob. Montclair VII, Caldwell V, 17 (Kf); Malaga IX, 22 (Dke); Anglesea VII, VIII (div).
P. lepidiana Clem. 5-mile beach VIII, 27 (Kf).
P. interruptofasciata Rob. Essex Co. Park, locally abundant in early July on leaves of aster in dark places in woods (Kf).
P. rutilana Hbn. Hunterdon Co., the larva injurious to trailing juniper.
P. romonana Kearf. Essex Co. VIII, IX, at light (Kf).
P. maiana Kearf. Great Notch, Passaic Co. V (Kf).
P. gunniana Bsk. Montclair V, 8 (Kf).
P. sublepidana Kearf. Caldwell, Essex Co. VII (Kf).
P. hospes Wlsm. Essex Co. VII, 10-VIII, 20 (Kf).
P. straminoides Grt. Essex Co. V, 20, VIII, 22-30 (Kf).
P. elderana Kearf. Anglesea VI, larva crumpling leaves of swamp elder (Kf).
P. lavana Bsk. Anglesea VIII, 27 (Kf).
P. œnotherana Riley. Essex Co. VII, 25 (Kf); Clementon IV, 30 (Haim); larva on evening primrose.
P. bunteana Rob. Essex Co. VII, VIII, and probably throughout the State, very common (Kf); 5-mile beach VII, 10-30 (Haim).
P. viscana Kearf. Essex Co. V, 20 (Kf).
P. aurorana Kearf. Essex Co. at light VIII, IX (Kf).
P. hollandana Kearf. Caldwell VIII, 13 (Kf).
P. voxcana Kearf. Montclair IX, 1 (Kf).
P. toxcana Kearf. Essex Co. at light VIII, IX (Kf).
P. marloffiana Bsk. Elizabeth (Kf).
P. temerana Bsk. Caldwell V, 17 (Kf).
P. winniana Kearf. Essex Co. at light V, 20, VII, 18 (Kf).
P. ednana Kearf. Will be found in New Jersey above 1,000 ft. elevation, VI (Kf).

HYSTEROSIA Steph.

- H. merrickana* Kearf. Essex Co. VII, 18-20 (Kf).
H. riscana Kearf. Essex Co. VII, 2, at light (Kf).
H. baracana Bsk. Essex Co. VII, 20-VIII, 24, abundant at light (Kf).
H. tiscana Kearf. Essex Co. VIII, at light (Kf).

PHARMACIS Hbn.

- P. bimaculana* Rob. Lakehurst VII, 4 (Kf).

Family YPONOMEUTIDÆ.

This is the first of a series of families to which the term micro-lepidoptera may be applied with strict propriety, and small as the majority are, many of them are veritable gems of beauty, far exceeding in brilliancy and richness their relatives of larger size. The wings are usually narrow, sometimes lanceolate, with very long fringes, which are especially marked in the secondaries. The antennæ are usually of moderate length and slender, but sometimes very long, the head often set with closely placed upright scales, appearing like a little plush cap. There are some exceptions to this type, notably the little series of shaggy forms allied to "Anophora"; but as a whole the characterization applies. The distinctive features of the various families are not obvious to any save the special student, and no attempt will be made to define them.

The larvæ are largely miners in leaves and vegetable tissue generally, though a few live in or on animal matter. Many of them make characteristic cases or mere tubes, in which they live, and among these the "clothes moths" have a well deserved if not particularly good reputation.

There are few collections of these species and our fauna is only imperfectly known.

YPONOMEUTA Latr.

- Y. multipunctella* Clem. 5-mile beach VII (div); larvæ will probably be found on apple or allied trees, gregarious, in webs; moths at light (Kf).

TRACHOMA Walgn.

- T. falciferella* Wlsm. Has been found along the highlands of the Hudson and will occur in the Appalachian region of New Jersey (Kf).

EIDO Cham.

- E. albapalpella* Cham. Will be found in New Jersey (Kf).

ATTEVA Wik.

- A. punctella* Cram & Stoll. (*aurea* Fitch.) National Park VII, 15, VIII, 2 (Dke); larvæ gregarious in webs on *Ailanthus*.

PLUTELLA Schranck.

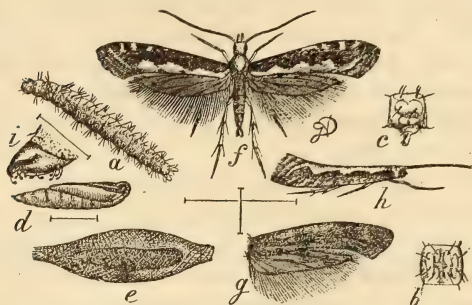


Fig. 233.—Cabbage Plutella, *P. maculipennis*: a, larva; b, c, segments of same; d, pupa; e, same in its cocoon; f, adult; g, wings of a variety: all enlarged.

- P. maculipennis* Curt. (*cruciferarum* Zell.) Common and g. d.; larva on cabbage and other cruciferous plants; but thus far not seriously injurious in New Jersey.
- P. porrectella* Linn. Abundant on hills north of Great Notch V, 21, just before sunset; in Europe larva feeds on "*Hesperis matronalis*" (Kf).

ZELLERIA Staint.

- Z. celastrusella* Kearf. G. d. in North Jersey, end V to mid VI wherever the climbing bitter-sweet occurs; larva webs up young leaves in spring (Kf).

PORPE Hbn. (CHOREUTIS Hbn.)

- P. inflatella* Clem. Greenwood Lake, Essex Co. VI, 10–VII, 25, not common (Kf); Anglesea IX, 8 (Dke).
- P. virginiella* Clem. Probably a variety of the preceding (Kf).
- P. gnaphaliella* Kearf. Great Notch and in hills above Montclair V, 10–VI, 21, locally common; larva webs leaves of "*Gnaphalium*."
- P. carduiella* Kearf. 5-mile beach VI, VII (div); larvæ very common in stalks of the large yellow-head thistle V & VI (Kf).
- P. onustana* Wlk. Undoubtedly occurs in the Appalachian region (Kf).

BRENTHIA Clem.

- B. pavonicella* Clem. Locally common, Caldwell and near Moorestown in woods V and VII; larva VI on underside of leaves of hog peanut, "*Amphicarpa*" (Kf); Merchantville VI, 4 (Dke).

SETIOSTOMA Zell.

- S. xanthobasis* Zell. Abundant in the scrub oak and pine-barren district near Lacy, VII; larva VIII, IX on oak leaves (Kf); Forked River Mts. VII, Manumuskin VIII, 17 (Dke).

GLYPHIPTERYX Hbn.

- G. impigritella* Clem. 5-mile beach VII, 3 (Haim).
- G. circumscriptella* Cham. Essex Co. VII, 1–7 rare (Kf).

ARGYRESTHIA Hbn.

- A. alternatella* Kearf. Essex Co. V, 21 (Kf); larva on conifers.
A. freyella Wlsm. Essex Co. VI, 10 (Kf); larva on arbor-vitæ.
A. goedertella Linn. Essex Co. VI, 22, VII, 12; a very dark form (Kf); larvæ, in Europe, in catkins of birch and alder.
A. oreasella Clem. (*andereggiella* F. & B.) Larva in buds of apple and hazel VI, VII (Kf).
A. apicimaculella Cham. Essex Co. VI, 12-VII, 25 (Kf).
A. subreticulata Wlsm. Essex Co. VI, not rare at light (Kf).
A. undulatella Clem. Montclair V, 27-30, very abundant on trunks of elms; larvæ probably in flower buds of this tree (Kf).
A. austerella Zell. G. d., Montclair, Anglesea VI, VII, common on trunk of oak, chestnut, holly and other trees (Kf); larva probably on lichens.
A. thuiella Pack. Essex Co. VII (Kf); larva mine leaves of arbor-vitæ.

ACROLEPIA Curt.

- A. incertella* Clem. Essex Co. VIII, 5, one specimen at light (Kf).

TANAGMA Zell.

- T. obscuroides* Cham. Great Notch VII, 10 (Kf).

Family GELECHIIDÆ.

METZNERIA Zell.

- M. lapella* Linn. Montclair and northern New Jersey, not common; larva on seeds of burdock, in burs all winter; adults in July (Kf); Ft. Lee (Dow).

PALTODORA Meyer.

- P. anteliella* Bsk. Montclair, at light VIII, 28-IX, 12 (Kf).
P. tripunctella Kearf. Essex Co. VI, 30-VII, 9, at light (Kf).
P. similiella Cham. Essex Co. VI, 30-VIII, 18 at light; larvæ in heads of sunflower (Kf).

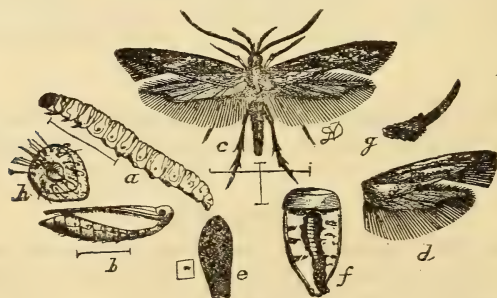
SITOTROGA Hein.

Fig. 234.—Angoumois grain moth, *Sitotroga cerealella*:
a, larva; *b*, pupa; *c*, moth; *d*, wings of a variety; *e*, egg; *f*, larva feeding in kernel of corn; all save *f*, greatly enlarged.

- S. cerealella** Oliv. Throughout the State. This is the "Angoumois grain moth" which infests wheat in shock, in the mow and until it is binned or bulked. Also attacks corn in warm places and in sheltered cribs, causing serious injury and rendering much grain unmillable or useless except as chicken feed. Remedial measures are prompt threshing, bulking in deep bins and the use of bisulphide of carbon where grain is actually infested.

GLAUCE Cham.

- G. pectenatæella** Cham. Essex Co. IX, 24, light (Kf).

TELPHUSA Cham.

- T. longifasciella** Clem. Caldwell IV, 29, rare (Kf).
T. fuscopunctella Clem. Common; larva webbing the young leaves of sweet fern in May; adults in June (Kf).
T. quinquecristatella Cham. Essex Co. Park IV, 21, rare (Kf).
T. latifasciella Cham. Sure to occur in New Jersey; larvæ web young leaves of huckleberry in May, issue in June (Kf).
T. quercinigracella Cham. Caldwell VIII; larva between two leaves of oak flatly stitched together in July (Kf).
T. palliderosacella Cham. Anglesea V, 30, abundant on tree trunks; larva on oak (Kf).
T. querciella Cham. (*Gelechia*) Common, larva on oak (Bt).
T. bifasciella Zell. Essex Co. Park, V, 20, Anglesea VI, 22, rare (Kf).
T. belangerella Cham. (*oronella* Wlsm.) Eagle Rock VII (Wdt); not rare; larvæ are leaf rollers on alders.

CHRY SOPORA Clem.

- C. lingulacella** Clem. Montclair at light VII, 17, rare; larva on "Chenopodium" and "Atriplex."

LEUCE Cham.

- L. fuscocristatella** Cham. Montclair, light, VIII (Kf).

ARISTOTELIA Hbn.

- A. roseosuffusella** Clem. Not rare VI, VII, at light (Dietz); larva mines leaves of red clover, and lives also in fruit panicles of sumac.
A. pudibundella Zell. (*intermediella* Cham.) Common at electric light VI, VII; larva on apple (Kf).
A. rubidella Clem. Montclair, common at light VI-VIII (Kf).
A. fungivorella Clem. 5-mile beach VI, VII (div); larvæ web leaves of bay-berry VI (Kf).
A. absconditella Wlk. Common at electric light VII, VIII; larvæ in stems of "Polygonum punctatum" (Kf).

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A. gilvolinella Clem. Described from Easton, Pa., and will certainly occur also on the east bank of the Delaware (Kf).

A. angustipennella Clem. Hemlock Falls VII (Wdt).

EVIPPE Cham.

E. prunifoliella Cham. Montclair VIII, 10 at light, not common; larva on peach and cherry (Kf).

RECURVARIA Haw.

R. apictripunctella Clem. Very abundant, North Jersey in June; larva in hemlock leaves (Kf).

R. variella Cham. Greenwood Lake, Montclair, light, VI, VII, larva on cypress (Kf).

R. piceaella Kearf. Larvæ mine the needles of black spruce, moths issue in June (Kf).

R. obliquestrigella Cham. Anglesea VI, larva in juniper (Kf).

R. juniperella Kearf. Essex Co. VI, larvæ mine leaflets of juniper (Kf).

R. thujaella Kearf. Larvæ mine in arbor-vitæ and are frequently so abundant that hedges look as if burned; moths in June (Kf).

R. cratægella Bsk. Essex Co. VI, VII, larva in "Cratægus."

R. robiniella Fitch. Montclair V, VI, larvæ sew two leaves of locust flatly together IX and X (Kf).

R. quercivorella Cham. Abundant on tree trunks in North Jersey IV, V; larvæ on oak leaves (Kf).

R. dorsivittella Zell. Essex Co. Park V, 20, rare (Kf); Jamesburg III (Sm).

TRYPANISMA Clem.

T. prudens Clem. Essex Co., larva on the upper side of oak leaves under a slight web (Kf).

EPITHECTIS Meyr.

E. attributella Wlk. (*Aristotelia*) Very abundant on tree trunks V-VIII, flying off in swarms when approached, g. d. (Kf); Jamesburg VII, 4 (Haim).

E. sylvicolella Bsk. Will be found in New Jersey (Kf).

E. gallægenitella Clem. (*Gelechia*) Larvæ in "Cynipid" galls on oak (Kf), and sure to occur in New Jersey.

"*Gelechia bicostomaculella*" Cham. is western and does not occur in New Jersey.

PARALECHIA Busck.

P. pinifoliella Cham. (*Aristotelia*) Common, g. d., larva mines needles on "Pinus rigida" (Kf); at light VI.

- P. cristifasciella* Cham. (*Gelechia inscripta* Wlsm.) Throughout the State IV, V, VII, locally common; on tree trunks; larva between spun together leaves of oak (Kf).

PHTHORIMÆA Meyr.

- P. operculella* Zell. Not yet reported from New Jersey, but sure to occur. Larvæ are frequently very destructive to stored potatoes by mining galleries through them.

GNORIMOSCHEMA Bsk.

- G. gallæsolidaginis* Riley. (*Gelechia*) Throughout the State in local colonies IX–XI, adults hibernating; larvæ make fusiform swellings in stems of goldenrod (Kf).
- G. solidaginella* Kearf. Long Beach, very common; habits similar to preceding, on "*Solidago sempervirens*" only (Sm).
- G. busckiella* Kearf. Caldwell X; larva make galls in lateral stems of "*Aster patens*" (Kf).
- G. gallæsteriella* Kell. Certain to be found in New Jersey, larvæ making galls in stems of asters (Kf).
- G. pedmontella* Cham. Essex Co. VI, at light, not common (Kf).
- G. banksiella* Bsk. Essex Co. VI, 21–VII, 1, at light, not common (Kf).
- G. batanella* Bsk. Essex Co. VI, 24–VII, 4, rare (Kf).
- G. detersella* Clem. Described from Easton, Pa., and sure to occur in New Jersey (Kf).

POLYHYMNO Cham.

- P. luteostrigella* Cham. Essex Co. VIII, larvæ spin together leaves of "*Cassia chamæchrista*" (Kf); Anglesea VIII, 21 (Lt).

APROÆREMA Durr.

- A. palpillineella* Cham. Montclair VII–IX, at light, abundant (Kf).
- A. kearfottella* Bsk. Essex Co. Park, VII, VIII, rare. Taken in open spots in woods where the most common plants are Leguminosa and huckleberry.
- A. nigratomella* Clem. (*Anacampsis apicistrigella* Cham.) Greenwood Lake, Essex Co., not rare on tree trunks (Kf); Bloomfield VII (Wdt); among scrub oak and at electric light VI, VII.
- A. concinuseella* Cham. Easton, Pa., and certain to occur in New Jersey (Kf).

ANACAMPSIS Curt.

- A. innocuella* Zell. Essex Co.; larvæ in curled leaves of poplar, not rare (Kf).
- A. rhoifructella* Clem. (*Tachyptilia*) Essex Co. VI, VII, larva between spun together leaves of "*Viburnum*" (Kf).

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- A. *nonstrigella* Bsk. Essex Co. Park VII, VIII, rare (Kf).
- A. *levipedella* Clem. (*Strobisia*) Caldwell IX, Essex Co. Park (Kf).
- A. *lupinella* Bsk. Iona VI; larvæ found abundantly folding together the leaves of "*Lupinus perennis*," V, 17 (Kf).
- A. *agrimoniella* Clem. (*Tachyptilia*). Essex Co. VI, VII, IX (div); in old fields where "*Agrimonia*" is abundant the moths can sometimes be found in myriads (Kf).
- A. *tristrigella* Wlsm. Sure to occur in New Jersey (Kf).

GELECHIA Hbn.

- G. *cercerisella* Cham. Ft. Lee Dist. (Dow); larvæ spin together leaves of red-bud (Kf).
- G. *coloradensis* Bsk. Delair VIII, 7, one specimen (Dke).
- G. *trialbamaculella* Cham. (*epigæella* Cham.) Essex Co. VII, larvæ abundant in VI, spinning together young leaves of huckleberry.
- G. *continuella* Zell. Anglesea VI, 22, rare (Kf).
- G. *lugubrella* Fabr. Will be found in Northern New Jersey (Kf).
- G. *hibiscella* Bsk. Anglesea V, 30, light, rare (Kf); larvæ on leaves or in seed capsules of rose mallow (Bsk).
- G. *discoocella* Cham. Electric light VI, VII; larva on smart-weed (Kf).
- G. *ornatifimbriella* Clem. Essex Co. VI, not rare at light (Kf).
- G. *unctella* Zell. Larvæ tie together leaves of locust VI, adults VII (Kf).
- G. *rileyella* Cham. Essex Co. Park VII, 24, at light (Kf).
- G. *bicostomaculella* Cham. Essex Co. Park VII, 4, rare (Kf).
- G. *nigrimaculella* Bsk. Essex Co. VII, VIII, on tree trunks (Kf).
- G. *dyariella* Bsk. Essex Co. VI, on tree trunks (Kf).
- G. *maculimarginella* Cham. Caldwell, Essex Co. Park VII, on tree trunks; larvæ between leaves of oak (Kf); Wenonah V (Haim); Brown's Mills VI (Dke).
- G. *gilvamaculella* Clem. Essex Co. VIII, on tree trunks; larva on oak (Kf).
- G. *pseudoacaciella* Cham. Larvæ web leaves of locust; moths V, VIII (Kf); Clementon IX (Haim).
- G. *serotinella* Bsk. Larva sews together the two edges of a wild cherry leaf, living within a tube of silk and frass, VII-IX (Kf).
- G. *vernella* Murtf. Larvæ abundant in early spring crumpling young oak leaves; adults VI, Essex Co. (Kf).
- G. *mediofuscella* Clem. (*vagella* Wlk.) Montclair, light V, g. d. (Kf); Hemlock Falls VIII (Wdt); Gloucester Co. IV, 30 (Haim).
- G. *walsinghami* Dietz. Anglesea V, 30, larva on leaves of sumac (Kf).
- G. *pseudofondella* Bsk. Essex Co. VII (Kf).
- G. *conclusella* Wlk. Greenwood Lake, Essex Co. VI, VII, abundant on tree trunks (Kf).

G. branella Bsk. Essex Co. VII, 12-VIII, 22 (Kf).

"G. triocella" Cham. does not come within our faunal range.

MENESTA Clem.

M. tortriciformella Clem. Recorded from New Jersey, larva on hazel (Kf).

M. albaciliæella Cham. Essex Co. Park VI, rare (Kf).

STROBISIA Clem.

S. iridipennella Clem. Caldwell VII, abundant, larva on hog peanut (Kf); Newbold VII (Dke); Wenonah VII (Haim).

S. emblemella Clem. Caldwell, Montclair VI, VII (Kf).

"Malacotricha bilobella" Zell. has not yet occurred in the State.

TRICHOTAPHE Clem.

T. flavocostella Clem. Essex Co., common VI, at light, larva on leaves of aster (Kf); Elizabeth VII (Wdt).

T. inserrata Wlsm. Anglesea, common at light; larva on "solidago" (Kf).

T. serrativittella Zell. Montclair IX, light, not common (Kf); Wenonah VII, VIII (Haim).

T. alacella Clem. Essex Co. V, common, larva on aster (Kf).

T. juncidella Clem. Essex Co. V, common, larva on aster (Kf); New Brunswick (Sm).

T. setosella Clem. Very common, larva on aster and "Solidago" V, adults VI (Kf).

T. levisella Fyles. Essex Co. Park, larva on "Aster macrophyllus" V, adults VI, very rare (Kf).

GLYPHIDOCERA Wlsm.

G. aberratella Bsk. Essex Co. VIII, 20-IX, 20 (Kf).

G. spiratella Bsk. Essex Co. VI, 25-29 (Kf).

ANORTHOSIA Clem.

A. punctipennella Clem. Rare VII, at light and borders of woodland.

DICHOMERIS Hbn. (YPSOLOPHUS Fabr.)

D. punctidiscellus Clem. Greenwood Lake, Essex Co., VI, common in woods (Kf); Wenonah V, 30 (Haim).

D. vacciniella Kearf. Essex Co. VII; larvæ folding or crumpling leaves of huckleberry VI (Kf).

D. ligulellus Hbn. (pometellus Haw.) Throughout the State, V-IX, locally common, larva on apple, pear and plum.

D. bipunctellus Wlsm. Rather rare, April, in scrub-oak.

D. marginellus Fab. A recently introduced European species, larvæ on Junipers.

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- D. ventrellus** Fitch. Hemlock Falls VII (Wdt); Essex Co., rare, larva on oak (Kf).
D. eupatoriellus Cham. Sure to occur in New Jersey; feeds on "Eupatorium" (Kf).
D. georgiella Wlk. (*roseocostellus* Wlsm.) Not common, larva on poplar (Dietz).

ANARSIA Zell.

- A. lineatella** Zell. Throughout the State; larva has been recorded in woody excrescences of plum, peach and apple and in stems of strawberry. I have seen it only boring into the tips of peach twigs; but not in destructive numbers.

Family XYLORYCTIDÆ.

PTOCHORYCTIS Meyr.

- P. tsugensis** Kearf. V, 7-23, near Rutherford, larvæ in cases on Japanese Hemlock.

Family STENOMATIDÆ.

A family of moderate-sized moths, frequently having remarkable mimetic characters in coloration and position affected when at rest. The larvæ so far as known are principally leaf folders.

STENOMA Zell.

- S. schlægeri** Zell. Throughout the State V, VI, IX; larva on wax myrtle and oak. This and the other species of the genus when resting on a leaf so closely resemble gray and white bird droppings that it is impossible to distinguish them until the moth is made to move.
S. leucillana Zell. Passaic Co. (Bwl); Essex Co. VIII, at light, rare, larva probably on oak (Kf); Brown's Mills V, 19 (Dke); 5-mile beach VII, VIII (Haim).
S. humulis Zell. Essex Co., Anglesea, VIII, g. d. (Kf); larva on oak and chestnut VII.

BRACHILOMA Clem.

- B. unipunctella** Clem. Certain to be found in New Jersey (Kf).
B. quercicella Bsk. Essex Co., mature larva in mid V, crumpling young oak leaves, moths VIII, larvæ of second brood IX, X (Kf).
B. decorosella Bsk. Lacy and Lakehurst districts VII, VIII; larvæ very common, tying together flatly small bunches of oak leaves VI, VII.

Family ŒCOPHORIDÆ.

A family of small or moderate-sized species, the larvæ on leaves, in flowers, seeds, on decayed wood or other dead material and sometimes as leaf miners.

MARTYRINGA Busck.

- M. latipennis** Wlsm. Sure to be found in the Appalachian region (Kf).

EUMEYRICKIA Busck.

- E. trimaculella** Fitch. Certain to occur in the northern section; common in spruce stumpage in Wyoming Co., Pa. (Kf).

CRYPTOLECHIA Zell.

- C. tentoriferella** Clem. (*Machimia*) Essex Co. IX, common on tree trunks; larva on many kinds of trees, makes a little tent on underside of leaves (Kf); Elizabeth IX (Wdt); Merchantville X (Dke).

PSILOCORIS Clem.

- P. quercicella** Clem. (*Cryptolechia*) G. d., not rare, larva between spun-together leaves of oak, aspen, chestnut (Kf).
P. reflexella Clem. (*Cryptolechia*) With the preceding and very like it; larva with same habits and often on same leaves, but easily distinguishable (Kf); Manumuskin V, 21 (Dke).

AGNOPTERYX Hbn.

This is a division of "Depressaria" Haw.; the moths of both genera hibernates in brush-piles, out-houses, etc., and can be found in such places on warm days throughout the winter. Larvæ usually in crumpled leaves or stems of "Umbelliferæ" and "Compositæ."

- A. atrodorsella** Clem. New Jersey (Bt); larva in beggar-tick.
A. nebulosa Zell. Middle Atlantic States and sure to occur in New Jersey (Kf).
A. curviliniella Beut. Recorded from near New York (Bt).
A. pulvipennella Clem. Denville XI (Bwl); Elizabeth VIII (Kf); on "Solidago" and "Eupatorium" in leaf folded lengthwise (Kf).
A. flavicomella Engel. Essex Co. Park VII, not rare at light (Kf).
A. robiniella Pack. (*Depressaria hillarella*) New Jersey (Bt); Jersey City Hts. IV, 27 (Sb); feeds on locust in leaf folded lengthwise.
A. lecontella Clem. Not common in New Jersey (Bt); Newark (Sb).

DEPRESSARIA Haw.

- D. heracliana** DeG. North of the Piedmont Plain (Sm); common, larva in stems of parsnips and other "Umbelliferæ" (Bt).
D. betulella Bsk. Essex Co., larvæ in spun-together leaves of black birch; but not bred (Kf).
D. grotella Rob. Larvæ in spun-together leaves of "Corylus americana" (Kf).
D. cinereocostella Clem. Larva ties together leaves of water parsnip (Kf).

INGA Busck.

- I. sparsiciliella** Clem. (*Cryptolechia contrariella*) New Jersey, not common (Bt); 5-mile beach VIII, 6 (Haim).

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SEMIOSCOPSIS Hbn.

- S. packardella* Clem. (*Epigraphia*). Montclair V, 18 (Kf); New Jersey (Bt).
S. megamicrella Dyar. Essex Co. III, 14 (Kf).
S. inornata Wlsm. Essex Co. III, 29, V, 15 (Kf).
S. allenella Wlsm. Essex Co. VI, 4 (Kf).

EPICALLIMA Dyar.

- E. argenticinctella* Clem. (*Œcophora*) Common, g. d., comes freely to light VI, 25-VIII, 10 (Kf); Stone Harbor VIII, 3 (Dke); 5-mile beach VII, 12 (Haim).

EUCLEMENSIA Grt.

- E. bassettella* Clem. (*Hamadryas*) Jamesburg VII (Sm); larva in "Kermes" sp. on oak (Kf).

FABIOLA Busck.

- F. shalleriella* Cham. Greenwood Lake VI, 10; larva probably on lichens (Kf).

ŒCOPHORA Latr.

- Œ. newmanella* Clem. (*Dasycera*) Greenwood Lake VI, 10 (Kf); New Jersey, rare (Bt); Gloucester Co. VI, 10 (Haim).

ENDROSIS Hbn.

- E. lacteella* Schiff. New Brunswick IX, 24 (Sm); in Europe the larva is on leaves of "*Epilobium hirsutum*" (Kf).

BORKHAUSENIA Hbn.

- B. ascriptella* Bsk. Essex Co. VI, at light (Kf).

"*Œgoconia quadripuncta*" Haw. is not found in New Jersey.

Family BLASTOBASIDÆ.

These moths are usually small in size with a peculiar silken sheen to the prevailing gray shade of the forewings. The favorite time for flight is an hour before sundown, when sometimes hundreds can be taken. The larvæ live in seeds, nuts and buds, as well as Aphid and Kermid galls.

PSEUDOPIGRITIA Dietz.

- P. dorsomaculella* Dietz. Essex Co. VII (Kf).

PIGRITIA Clem.

- P. confusella* Dietz. Essex Co. VI-VIII (Kf).

- P. laticapitella* Clem. Essex Co. VI-VIII (Kf); Anglesea V, VIII (div).
P. mediofasciella Dietz. Montclair VII, 1-10 (Kf).
P. angustipennella Dietz. Essex Co. VI, 17-VII, 7 at light (Kf).
P. obscurella Dietz. Essex Co. VI, 17 (Kf).
P. ochrocomella Clem. Essex Co. Park VIII, 4 (Kf).

PLÆOPHORA Dietz.

- P. fidella* Dietz. Essex Co. VII, 7 (Kf).

DRYOPE Cham.

- D. erratella* Dietz. Anglesea VIII, 21, not common (Sm).
D. ochreella Clem. (Pigrita) Generally distributed.

VALENTINIA Wism.

- V. glandulella* Riley. (Blastobasis) Throughout the State VI-VIII. Almost every acorn found on the ground in midwinter contains one or more of the larvæ of this species, often in company with a Tortricid and a Coleopterous larva.

HOLCOCERA Clem.

- H. chalcfrontella* Clem. (Blastobasis) Not rare at electric light VI, VII.
H. modestella Clem. Essex Co., not uncommon and g. d. at light VII-IX (Kf); Lucaston V, 20-VI, 5.
H. gilbociella Clem. Essex Co., at light, with the preceding (Kf).
H. purpurocomella Clem. Common at electric light V-IX (Dietz).
H. punctiferella Clem. Essex Co. VII, 25, VIII, 22 (Kf).
H. elyella Dietz. Essex Co. (Kf); type locality.
H. spoliatella Dietz. Essex Co. (Kf); type locality.

Family ELACHISTIDÆ.

COLEOPHORA Hbn.

No systematic work has been done in this genus, hence it is impossible to present a comprehensive list. It is certain that all species recorded from the eastern States will also occur in New Jersey, as well as many more not yet discovered. Careful breeding through a series of years will lengthen our list to over one hundred. As many of the species in the adult stage are indistinguishable from each other, the only reliable way to identify them is by breeding.

The larvæ are all case-makers, the cases distinctive for each species. In shape they range from slender flattened cylinders to one made of clusters of flowers. Almost every plant supports one or more species. many are confined to grasses and others live in seed-heads.

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In general the life histories are similar; eggs are laid in summer, the larva makes a small case in which it hibernates in the next to the last stage. In the earliest days of spring it resumes feeding for a few weeks, moths issuing May to July.

- C. cœnosipennella* Clem. Described from Pennsylvania.
- C. caryæfoliella* Clem. Cylindrical dark brown cases on hickory leaves.
- C. cerasivorella* Pack. Described from Massachusetts on cherry.
- C. concolorella* Clem. New Jersey in June.
- C. corruscipennella* Clem. Newark (Dn); Brown's Mills VII, 4 (Dke); g. d., not rare, larva on wild strawberry (Kf).
- C. corylifoliella* Clem. Larval cases flattened, with serrate edges, on upper side, on hazel.
- C. cratipennella* Clem. Hemlock Falls VIII, 30 (Wdt); very common at electric light V, VI (Kf).
- C. cretaticostella* Clem. Rare at electric light VI, VII (Dietz).
- C. fletcherella* Fern. Makes the small dark brown flattened case found in winter on limbs and trunks of apple; in May attaches its case to the upper side of an apple leaf (Kf).
- C. infuscatella* Clem. Described from Pennsylvania.
- C. laricella* Hbn. Small dark brown cases on larch (Kf).
- C. limosipennella* Dup. Larva in a flattened case with serrated upper edge, is sometimes injurious to the foliage of elms (Kf).
- C. leucochrysella* Clem. New Jersey in July.
- C. malivorella* Riley. Common throughout the State; larva on apple in a black, pistol-shaped case.
- C. pruniella* Clem. Larva in a large black pistol-shaped case on wild cherry (Kf).
- C. ostryæ* Clem. Larva in reddish brown flattened case on ironweed (Kf).
- C. querciella* Clem. A scimiter-shaped case, blackish posteriorly, anterior two-thirds white, on oak leaves (Kf).
- C. rosacella* Clem. Larva on opening buds of sweet briar, "Rosa rubiginosa."
- C. rosæfoliella* Clem. Larva on leaves of garden rose, "Rosa centifolia."
- C. tiliæfoliella* Clem. Somewhat rare species in a jet black pistol-shaped case on basswood (Kf).
- C. vagans* Wlsm. Larva makes a grayish cylindrical case on grass (Kf); bred, N. Y. City VIII.
- C. viburnella* Clem. Makes a flattened brown case with upper edge serrated on "Viburnum" (Kf).

BATRACHEDRA Staint.

- B. salicipomonella* Clem. Essex Co. V, 20-VI, 5 (Kf); larva in Cecidomyid and Tenthredinid galls on willow leaves.

COSMOPTERYX Hbn.

Species are small and slender but most elegantly ornamented; there is commonly a middle band of crimson or ochereous red, the rest of the wing having clusters and lines of brightest gold or silver. Larvæ are leaf miners.

- C. clemensella* Steph. Essex Co. g. d. (Kf); Anglesea (Lt).
- C. gemmiferella* Clem. Essex Co. VI, 15-VII, 15 (Kf); New Jersey, rare (Bt).
- C. fernaldella* Wlsm. Montclair at light VII, 1-5 (Kf).
- C. clandestinella* Busck. Will be found in southern New Jersey (Kf); larvæ mine the leaves of "Panicum clandestinum."

APHELOSETIA Steph.

- A. brachelytrifoliella* Clem. (*Elachista*) Larva mines the leaves of "Brachelytrum aristatum" early in July.
- A. illectella* Clem. Certain to be found in New Jersey.
- A. maculosella* Clem. Described from Pennsylvania.
- A. madarella* Clem. Sure to occur in New Jersey (Kf).
- A. orichalcella* Clem. Will be found in southern New Jersey.
- A. præmaturella* Clem. New Jersey in early April.

LYMNÆCIA Staint.

- L. phragmitella* Steph. Abundant in marshes everywhere (Kf); larva in stems of cat-tails; Newark; Orange Mts., VII (Wdt); 5-mile beach VII (Haim).

SCYTHRIS Hbn.

- S. basilaris* Zell. Essex Co. VIII, 15 (Kf); New Brunswick VI, 28 (Sm); Anglesea VII, 24 (Lt).
- S. eboracensis* Zell. Common at Greenwood Lake and Anglesea VI (Kf); Jamesburg VI (Sm); Merchantville V, 25, Iona VI, Brown's Mills VII, 22 (Dke).
- S. impositellus* Zell. Common, larva on asters (Bt); Wenonah V, 30 (Haim); 5-mile beach V, VI (div).
- S. fuscicomella* Clem. N. Woodbury VI, 17 (Kf).

ANTISPILA Hbn.

- A. isabella* Clem. Rare, larva mines leaves of *Isabella* grape IX.
- A. cornifoliella* Clem. Essex Co. VI, 18, larva makes a blotch mine on "Cornus."
- A. nyssæfoliella* Clem. Wenonah V, VI (div); common, larva mines leaves of "Nyssa multiflora" IX (Dietz).
- A. viticordifoliella* Clem. Not rare; larva makes an orange colored blotch mine on the leaves of wild grape, "Vitis cordifolia" in August (Dietz).

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THEISOA Cham.

- T. constrictella** Zell. Montclair VI, 10, not common; usually found about elms and larvæ will likely be found on their leaves.

STILBOSIS Clem.

- S. tesquella** Clem. North Jersey VII, 1 abundant; larva makes large white blotch mines in leaves of hog peanut (Kf).

HELIOZELA H. S.

- H. æsella** Cham. National Park V, 6 (Dke).

CYCLOPLASIS Clem.

- C. panicifoliella** Clem. Larvæ mine leaves of "Panicum clandestinum" VII, cutting out a circular piece for cocoon; adult mid-VII (Kf).

COPTODISCA Wlsm.

- C. lucifluella** Clem. Larva mines leaves of hickory IX, X; cuts an oval case from skin of leaf, attaches to tree trunk and pupates; imago in July (Kf).
C. ostryæfoliella Clem. Lives like the preceding but on ironwood (Kf).
C. saliciella Clem. Mines leaves of willow, habits as in preceding (Kf).
C. splendoriferella Clem. (*Aspidisca*) Common; larva mines leaves of "Cratægus," apple, plum and wild cherry (Kf); National Park V, 29 (Dke).

EPERMENIA Hbn.

- E. ramapoella** Kearf. Abundant V, 27, about 1,000 feet elevation on Ramapo Mt.; in thick woods; will be found in similar places in New Jersey.
E. cicutella Kearf. Orange Mts., larva as leaf miners and later in flower and seed heads of water hemlock; adults VIII (Kf).

STAGMATOPHORA H. S.

- S. sexnotella** Cham. Essex Co. Park VI, 25-VIII, 7 at light; larva in stem galls on "Trichostomum dichotoma" (Kf).

MOMPHA Hbn. (LAVERNA Curt.)

- M. brevivittella** Clem. Lucaston X, 18 (Dke), and probably g. d.; larva in seed capsules of evening primrose (Kf).
M. circumscriptella Zell. Anglesea VIII, 30, rare (Sm); larvæ in seed capsules of evening primrose (Kf).
M. definitella Zell. "New Jersey" VIII, 24 (Lt).
M. eloisella Clem. Throughout the State; larva in stalks of evening primrose through winter; pupate late V, and issue as adults VI (Kf).

M. luciferella Clem. Eastern Pennsylvania, New York and probably New Jersey.

M. ruficristatella Cham. Anglesea VII, 30, rare (Sm).

SCHRECKENSTEINIA Hbn.

S. felicella Wlsm. Essex Co. X, 10 (Kf).

S. erythriella Clem. Not rare V and VIII (Kf); larva on fruit racemes of sumac (Clem).

WALSHIA Clem.

W. amorphella Clem. Essex Co. VII, VIII; larva in a gall on the stem of "*Amorpha fruticosa*" (Kf).

Family TINEIDÆ.

STIGMELLA Schranck. (NEPTICULA von Hdn.)

Members of this genus are seldom seen except as bred, and they are among the most minute of all Lepidoptera, some measuring no more than $\frac{1}{8}$ inch in expanse of wings. The larvæ are all leaf-miners, usually deserting the mine to pupate in a tough little cocoon attached to a twig or upon the ground. Mines are found from mid-June until frost, and the distribution of the species is usually co-incident with that of its food plant.

S. amelanchieriella Clem. Larva in a broad tract mine in leaves of June or Service-berry (Kf).

S. anguinella Clem. Larva on oak leaves in narrow serpentine mine (Kf).

S. bifasciella Clem. In August, at light (Clem).

S. caryæfoliella Clem. Larva in a very narrow whitish mine on leaves of hickory (Kf).

S. corylifoliella Clem. Larva makes a long, winding, narrow tract mine in a hazel leaf (Kf).

S. cratægifoliella Clem. Larva in a rather short tract mine in leaf of thorn (Kf).

S. fuscotiella Clem. At light VIII, larva on willow.

S. juglandifoliella Clem. Larvæ in narrow whitish tract mine on black walnut (Kf).

S. nyssæfoliella Cham. Larva makes a linear mine on leaves of "*Nyssa multiflora*"; imago in April.

S. platanella Clem. Larva makes large irregular blotch mine on under-side of sycamore leaf (Kf).

S. ostryæfoliella Clem. Larva in moderately wide tract mine in leaf of ironwood (Kf).

S. obrutella Zell. Essex Co. V, 20 (Kf).

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- S. platea* Clem. Larva mine oak leaves in moderately broad winding tract (Kf).
- S. pomivorella* Pack. Essex Co., common (Kf); larva mines leaves of apple.
- S. prunifoliella* Clem. Larvæ make linear mines in leaves of wild cherry (Kf).
- S. rosæfoliella* Clem. Larvæ make serpentine mines in leaves of sweet brier (Kf).
- S. rubifoliella* Clem. Larva makes blotch mine in leaf of blackberry (Kf).
- S. saginella* Clem. Larva makes moderately broad serpentine tract in leaves of oak and chestnut (Kf).
- S. villosella* Clem. Larva makes very narrow linear mine in blackberry (Kf).
- S. virginella* Clem. Larva makes a long narrow tract mine in leaf of ironwood (Kf).

OPOSTEGA Zell.

- O. albogaleriella* Clem. Essex Co. V, 26 (Kf); 5-mile beach VII, 5 (Haim).
- O. nonstrigella* Cham. Essex Co VIII, 6 (Kf).
- O. quadristrigella* Cham. Essex Co. VII, 10-VIII, 8 (Kf).

BUCCULATRIX Zell.

Small species that often occur in large numbers on tree trunks in May and June. Larvæ are leaf miners in early stages, later feeding externally. When mature they spin a slender silken cocoon with longitudinal ribs or ridges, which are characteristic for the genus. Hibernates as pupa.

- B. agnella* Clem. Flies about mid May (Clem).
- B. coronatella* Clem. Essex Co., abundant, larva on black birch (Kf).
- B. canadensiella* Cham. Essex Co. IX, larvæ on leaves of birch (Kf).
- B. magnella* Cham. Essex Co. Park, abundant at light V-VII (Kf).
- B. pomifoliella* Clem. Occurs wherever apples are grown, larva feeding externally, IX, sometimes abundant, but usually rather rare (Kf).
- B. quinquenotella* Cham. Not rare in June (Dietz).
- B. thuiella* Pack. The cocoons have been found on spruce in Essex Co., but the moths have not been bred (Kf).
- B. trifasciella* Clem. Larva on chestnut (Dietz).

PHYLLONORYTER Hbn.

All the species of this genus = "Lithocolletis" Hbn., are leaf miners, and as their habits throughout are very similar, individual dates and localities are mostly omitted. The earliest mines are found late in July and until frost there are two or more broods, frequently overlapping.

They hibernate as larvæ or pupæ, rarely as imagos. With few exceptions the species in the following list have been bred or observed in Essex County, and examples will be found wherever the food plant occurs.

- P. fitchella* Clem. Common, larva on oak, mining underside of leaves.
- P. trinotella* Braun. One specimen, the type, Essex Co. Park IV, 26.
- P. quercialbella* Fitch. Larvæ in tentiform mines on under side of oak leaves, g. d.
- P. argentifimbriella* Clem. G. d., larva in tentiform mines on underside of oak leaves.
- P. lucidicostella* Clem. Larva mines underside of maple, "Acer saccharinum," not common but g. d.
- P. obscuricostella* Clem. The larva mines the underside of the leaf of ironwood, "Ostrya virginica."
- P. ostryæfoliella* Clem. As in preceding, but the mine is much more wrinkled and usually near the margin of the leaf.
- P. kearfottella* Braun. Larvæ make narrow mines on underside of chestnut leaves at Montclair, usually along a vein.
- P. gemmea* F. & B. Larva mines upperside of leaves of locust.
- P. morrisella* Fitch. Larva makes whitish mines on underside of leaves of "Amphicarpa."
- P. uhlerella* Fitch. Larva mines under surface of leaves of false indigo.
- P. robiniella* Clem. Common, larva mines leaf of locust.
- P. auronitens* F. & B. Larvæ make rounded, flattened mines on underside of leaves of alder, "Alnus serrulatus."
- P. scudderella* F. & B. Mines on the underside of willow leaves.
- P. salicivorella* Braun. The type was bred from a mine on the underside of willow leaf in Essex Co., issued VII, 19.
- P. malimalifoliella* Braun. Larvæ make small, teniform, much wrinkled mines on underside of apple leaves at Montclair.
- P. cratægella* Clem. Larva in mines on underside of leaves of blackthorn, apple and wild cherry; Gloucester Co. IV (Haim).
- P. propinquinella* Braun. A common underside miner on wild cherry.
- P. populiella* Cham. Larva in a very small tentiform mine on underside of aspen leaf.
- P. ærifereila* Clem. Makes small mines on underside of oak leaves.
- P. obsoleta* F. & B. Described from flown specimen taken in Mass.; will be found in New Jersey; nothing known of life history.
- P. argentinotella* Clem. Larva mines underside of elm leaves.
- P. basistrigella* Clem. Larva mines the underside of oak leaves.
- P. lucetiella* Clem. Larva mines the underside of leaves of basswood.
- P. ostensackenella* Fitch. Larva makes a yellow blotch mine on upper or lower surface of leaf of locust.
- P. tritænianella* Cham. Larvæ make rather large tent mines on upper side of leaves of ironwood.

- P. tilieacella* Cham. Larvæ make nearly circular tentiform mines on upperside of leaves of basswood.
- P. fragilella* F. & B. Larva in underside mines on leaves of "Loniceræ."
- P. salicifoliella* Clem. Larvæ in underside mines on leaves of different species of poplar and willow.
- P. caryæfoliella* Clem. Larva mines upperside of hickory leaves, g. d.
- P. lentella* Braun. Larvæ found in community mines on upperside of leaves of black birch and ironwood.
- P. saccharella* Braun. Bred from irregular blotch mine on the upperside of leaves of sugar and black maple.
- P. macrocarpella* F. & B. Larvæ in upperside mines on oak and chestnut.
- P. cincinnatiella* Cham. Very abundant some years; larvæ make large community mines on upperside of oak leaves (Kf); Gloucester Co. V (Haim).
- P. hamadryadella* Clem. Very common; larvæ make a large whitish blotch mine on upperside of oak leaf (Kf); Delair VIII (Dke).

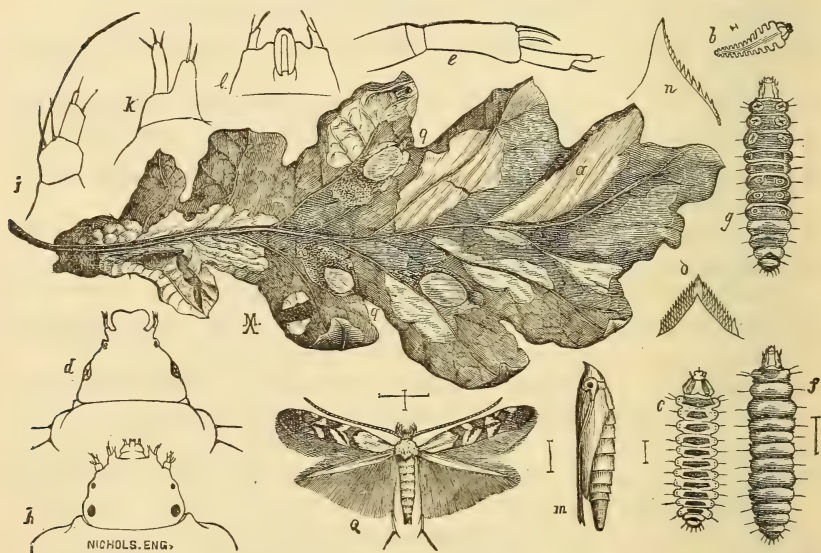


Fig. 235.—*Phyllonoryter hamadryadella* and the work of its larva on an oak leaf; *q*, moth; *m*, pupa; *c*, *f*, *g*, larvæ: all enlarged. The other figures are of structural details.

- P. conglomeratella* Zell. Larvæ in leathery brown blotch mines on upperside of oak leaves.
- P. ulmella* Cham. Larvæ form irregular blotch mines on upperside of elm leaves.
- P. quercivorella* Cham. Larva makes flat blotch mine on upperside of oak leaves.
- P. cervina* Wlsm. Described from a single flown specimen taken in New York State (Kf).

- P. platanoideiella** Braun. Larva in blotch mine on upperside of oak leaves.
- P. betulivora** Wlsm. Larva in small, nearly circular mine on upperside of birch leaf.
- P. bethunella** Cham. Larva in ovate blotch mine on upper surface of oak leaf.
- P. guttinitella** Clem. Larvæ mine upperside of leaves of poison ivy until frost kills them.
- P. obstrictella** Clem. Larva mines upperside of oak leaf; common.
- P. corylisella** Cham. Larvæ make blotch mine on upperside of hazel leaf.
- P. ostryarella** Cham. Larvæ form community mines on upperside of leaves of ironwood and hornbeam.
- P. aceriella** Clem. Larva makes a broad tract mine on upper side of maple leaf; adults V and IX.
- P. hamamelis** Bsk. Larva in a whitish blotch mine on upper surface of witch-hazel leaf.
- P. tubiferella** Clem. Larva makes a long sinuate band-like mine on upperside of oak leaves, mine gradually increasing in width and frequently crossing, so that it cannot be mistaken for any other species.

PORPHYROSELA Braun.

- P. desmodiella** Clem. (*Lithocolletis*) Larva mines underside of leaves of "Desmodium," "Lespedeza" and "Phaseolus."

CREMASTOBOMBYCIA Braun.

- C. solidaginis** F. & B. Larvæ are abundant in late summer in wrinkled mines on under surface of leaves of goldenrod.
- C. ambrosiella** Cham. Larvæ make small mines on underside of leaves of Ambrosia and allied plants.
- C. ignota** F. & B. Rather large mines on underside of leaves of "Compositæ."

BEDELLIA Staint.

- B. somnulentella** Zell. Larva makes blotch mine on morning-glory IX. at times feeds externally; adult X, probably two-brooded.

GRACILARIA Haw.

The species are usually brilliant golden yellow, red and brown. Rest on leaf in characteristic pose, fore part of body much raised, the posterior end touching the leaf. Fly freely to light. Larvæ are all leaf miners in early stages, some leave mine when half grown and form cones by twisting and rolling end of a leaf.

- G. aceriella** Cham. Larvæ make cones at ends of maple leaves.
- G. blandella** Clem. Larvæ found in their cones on walnut leaves.

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- G. *coroniella* Clem. Larva on birch.
- G. *violacella* Clem. Larva makes cones of leaf ends of "Desmodium."
- G. *juglandiella* Cham. Larvæ make cones on hickory leaves.
- G. *negundella* Murtf. Montclair IX, larvæ in cones on "Acer negundo."
- G. *stigmatella* Fabr. Larva makes cones of willow leaves.
- G. *rhoifoliella* Cham. Larva makes cones of leaves of sumac.
- G. *salicifoliella* Cham. Larvæ make large blotch mines on willow leaves.
- G. *sassafrasella* Cham. Larva on sassafras, in leaf rolled downward (Bt).
- G. *alchimiella* Scop. Essex Co. V, VII; larvæ in cones on oak.
- G. *superbifrontella* Clem. Essex Co. V, VII; larva on witch-hazel.
- G. *packardella* Cham. Essex Co. V, 10 (Kf).
- G. *ribesella* Cham. Essex Co.; several specimens found in mid-winter, under bark of hickory.
- G. *burgessiella* Zell. Larva on swamp huckleberry; adults V, VI (Dietz).
- G. *belfrageiella* Cham. Should occur in New Jersey (Sm).
- G. *swederella* Thunb. Larva rolls end of red maple leaves into cones.

DIALECTICA Wlsm.

- D. *strigifinitella* Clem. Essex Co. VI, 24 (Kf); National Park VI, 10, Hammonton IX, 6 (Dke); larva on oak.
- D. *venustella* Clem. Essex Co. VII, IX, at light (Kf).

PARECTOPA Clem.

- P. *lespedezæfoliella* Clem. Larva mines leaves of bush clover.
- P. *robiniella* Clem. Larva makes a digitate blotch mine on the upper surface of the leaves of locust.
- P. *pennsylvaniella* Engel. Essex Co. VII, IX, abundant at light.

ORNIX Tr.

• The larvæ turn over the edge of a leaf, forming a flap, three or four often present on one leaf; the cocoon is spun on the ground and the imago does not issue until the following spring.

- O. *guttea* Haw. Larvæ often very abundant on apple, sometimes nearly every leaf on the lower part of a tree being affected.
- O. *solitariella* Dietz. Bred from apple leaf, Essex Co.
- O. *kalmiella* Dietz. Larva on "Kalmia angustifolia," sheep laurel.
- O. *preciosella* Dietz. Larva on swamp huckleberry.
- O. *cratægifoliella* Clem. Larva on leaves of black thorn.
- O. *conspicuell*a Dietz. Larva abundant on birch, Essex Co, IX, X.
- O. *prunivorella* Cham. Larva on wild cherry, Essex Co. VIII-XI; not rare.
- O. *quadripunctella* Clem. Larvæ on choke cherry.

CORISCUM Zell.

- C. paradoxum* F. & B. Recorded from the "Atlantic States."
C. cuculipennellum Hbn. Larva in conically rolled leaves of "Ligustrum."
C. ampicarpæfoliella Clem. (*Leucanthiza*) Common; larva on hog-peanut, "*Amphicarpa monoica*."

MARMARA Clem.

- M. salictella* Clem. The larvæ have the curious habit of mining the tender inner bark of young willow in long lines, Essex Co. Park.

PROLEUCOPTERA Busck.

- P. albella* Cham. Essex Co. VI-VIII, not rare at light and in open woods.
P. smilaciella Bsk. Essex Co. VIII; larva makes blotch mines in leaves of cat-brier; pupa in hammock-like cocoon on underside of leaf.

PHILENOME Cham.

- P. clemensella* Cham. Essex Co. not rare, VII, on tree trunks.

LYONETIA Hbn.

- L. speculella* Clem. Essex Co. VI, VII.

PHYLLOCNISTIS Zell.

- P. ampelopsiella* Cham. Essex Co. V, 26; larva in long winding thread-like mines in Virginia creeper.
P. vitifoliella Cham. Montclair IX; larvæ VIII, make long winding lines on grape leaves.
P. vitigenella Clem. Larva makes tract mine in leaves of grape.
P. liriodendrella Clem. Essex Co. V, 30; larva makes long, winding linear mines in leaves of tulip poplar.
P. magnoliella Cham. Essex Co., Moorestown, Lacy, Anglesea; larva makes linear mines on leaves of swamp and ornamental magnolias.
P. erechitisella Cham. Larva makes linear mine in leaves of fireweed, "*Erechitis*," VIII, adult late VIII and IX, common.

TISCHERIA Zell.

- T. citripennella* Clem. Common, larva in a trumpet-shaped mine on oak, imago VI and VII.
T. quercitella Clem. Essex Co., larva makes dentate mines on upper-side of oak leaves.
T. solidaginifoliella Clem. Larva mines leaves of goldenrod.
T. malifoliella Clem. Throughout the State; larva makes a yellowish brown blotch mine in leaves of apple, several broods overlapping, so that mines and imago may be found V-X.
T. ænea F. & B. Common; larva makes funnel-shaped blotch mine in leaves of blackberry; adult VII, VIII, IX.

COPTOTRICHE Wism.

- C. zelleriella* Clem. G. d., larvæ make tentiform mines upperside oak and chestnut leaves VII, VIII, adults the following spring.

AMADRYA Clem.

- A. effrenatella* Clem. Newark VII (Wdt); very common at light VI, VII (Kf); Gloucester Co., VI, 10 (Haim).
A. dyarella Dietz. Penna. to District of Columbia, at light and sure to occur in New Jersey.
A. atlantica Kearf. Essex Co. VII, 24, VIII, 14 (Kf).

SETOMORPHA Zell.

- S. insectella* Fab. Almost cosmopolitan; recorded from all parts of North America, its larvæ on hair, wool and dried animal products.
S. anatomella Grt. (Scardia) Lahaway, bred from fungus growths on oak, rare (Sm).
S. approximata Dietz. Essex Co. VI, VII, at light (Kf); Jamesburg VII, 4 (Haim).

XYLESTHIA Clem.

- X. pruniramiella* Clem. Common, g. d., larva in woody excrescences on plum trees; Orange VII (Wdt); Anglesea V, VIII (div).
X. kearfottella Dietz. Essex Co. VII, at light, abundant.

MONOPIS Hbn.

- M. rusticella* Hbn. G. d., on tree trunks and at light, VI, VII.
M. biflavimaculella Clem. G. d., not rare, on tree trunks VII-IX.
M. marginistrigella Cham. Essex Co. VI, IX, less common than preceding.
M. crocicapitella Clem. (*Blabophanes ferruginella*) G. d., common on tree trunks and at light. Essex Co. VI-IX; Anglesea VII (Lt); National Park VI (Dke).
M. dorsistrigella Clem. (*Blabophanes*) On tree trunks and at light, common, g. d., VI, VII (Kf); Merchantville VIII, Brown's Mills VI (Dke), 5-mile beach VI (Haim).

TRICHOPHAGA Rag.

- T. tapetiella* Linn. G. d., but very rare in collections (Kf); Staten Island, bred from larvæ in the excreted pellets of barn owls (Ds).

INCURVARIA Haw.

- I. russatella* Clem. Found VI, VII, on tree trunks in dark woods, and should occur in the Appalachian region of New Jersey (Kf).

CYANE Cham.

C. visaliella Cham. Essex Co. VI, VII (Kf).

PARACLEMENSIA Busck.

P. acerifoliella Fitch. (*Incurvaria*) Larva in blotch mine on maple, cut circular case from leaf when mature, pupate on ground, adults in spring (Kf); South River V, 26 (Coll).

ISOCORYPHA Dietz.

I. mediotriatella Clem. (*Incurvaria*) Essex Co. VIII, 14, rare (Kf); Lucaston VIII, 6 (Dke).

TINEA Linn.

These moths are frequently very abundant, but owing to their secretive habits are rarely found in numbers. The larvæ, so far as known, feed on dead or refuse material, rotten wood, fungi, dry animal products, etc., often in a case made of the fragments of the material on which they live.

T. fuscipunctella Haw. Common, g. d., larva on dry refuse, in cases; Gloucester Co. V, 29 (Haim).

T. apicimaculella Cham. Montclair V, at light (Kf).

T. bimaculella Cham. Essex Co. VI, rare, at light.

T. trimaculella Cham. Essex Co. VI, VII, rare, at light.

T. carnariella Clem. Essex Co., bred from a box of old insects (Kf); not rare in houses.

T. defectella Zell. Jamesburg VII, 4 (Haim).

T. pellionella Linn. One of the common "clothes moths" found in houses; the larvæ destructive to furs and woolen fabrics. The use of gasoline on infested carpets or other fabrics is advised where possible; naphthaline is a good repellent; while care, cleanliness and storage of woolen goods in tight paper bags or boxes during summer are effective means of preventing injury.

T. roburella Dietz. Described from an Essex Co. specimen.

T. rileyi Dietz. Very common VI, on stumps in land recently deforested; bred by Riley from larvæ in fungi.

T. arcella Fabr. G. d., larvæ feed in decayed wood.

T. auropulvella Cham. Abundant at light and on tree trunks VI, VII, g. d.

T. acapnopenella Clem. Essex Co., Anglesea VI-VIII, at light (Kf); Wenonah VIII, 20 (Haim).

T. granella Linn. Common, larva in grain and corn (Dietz); also bred from larvæ in tulip and crocus bulbs (Kf).

T. nigroatomella Dietz. The type was taken in Montclair (Kf).

TINEOLA H. S.

- T. biselliella* Hum. The most common of our "clothes moths"; in houses everywhere, the larva on furs and woolens; remedies as above.

TENAGA Clem.

- T. pomiliella* Clem. Eastern Pennsylvania VII, and probably New Jersey.

HYBROMA Clem.

- H. servulella* Clem. Common in North Jersey VII, VIII in open woods (Kf); Forest Hill VII (Wdt).

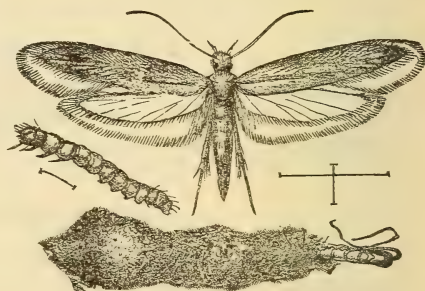


Fig. 236.—Common clothes moth, *Tineola biselliella*: larva; case with empty pupa shell, and moth: all enlarged.

EUDARCIA Clem.

- E. simulatricella* Clem. Will be found in the Appalachian region of New Jersey, V, VI on tree trunks.

MEA Busck.

- M. skinnerella* Dietz. Essex Co. VII, 18, at light.

DIACHORISIA Clem.

- D. velatella* Clem. Essex Co. VI and VII.

HOMOSETIA Clem.

- H. costisignella* Clem. Not rare in eastern and northern sections (Kf); Forest Hill VII (Wdt).
H. fasciella Cham. Montclair VI, VII.
H. miscecrstatella Cham. (*Tinea aurosuffusella* Cham.) Essex Co., at light, g. d. in June.
H. tricingulatella Clem. Essex Co. VII.

OENŒ Cham.

- O. hybromella* Cham. Essex Co. VII, at light.

ADELA Latr.

- A. bella* Cham. Locally abundant, Anglesea V, 26-30, flying in the sunshine between 10 and 12 A. M. (div).
A. purpura Wlk. Little Falls IV, 24, on blossoms of pussy willows (Ds).
A. ridingsella Clem. Palisades VI, 12 (Dke).

PRODOXUS Riley.

- P. intermedius** Riley. New Brunswick (Coll); Weymouth VI, 1-8 (Dke); the larvæ bore in stalks of *Yucca* in great numbers.

PRONUBA Riley.

- P. yuccasella** Riley. Occurs wherever *Yucca* is grown and seeds, the flowers depending upon this moth for pollination; larvæ develop in the seed capsules, pupate in cocoon on ground, adults emerge when flowers open.

ACROLOPHUS Poey.

- A. plumifrontellus** Clem. Throughout the State, locally not rare VI, VII.

ANAPHORA Clem.

These are large, robust species with very long curved palpi, the body covered with rough, coarse scales. They are sombre brown in color and altogether unlike in appearance to the forms with which they are associated.

- A. popeanella** Clem. Essex Co. VI, VII, very abundant at light.

- A. tenuis** Wlsm. Anglesea VI, 23 (Kf); this is probably the form listed as "propinqua" in last edition.

PSEUDANAPHORA Wlsm.

- P. arcanella** Clem. Throughout the State VII, usually common.

- P. mora** Grt. Newark X, 8 (Bwl); Riverton XI, Wenonah X (Dke); not uncommon X, g. d.; the flight is at 4 o'clock P. M., and one female in a cage will attract hundreds of males.

MICROPTERYGOIDEA.

In this series we have a remnant of ancient conditions, the two pairs of wings being held together by a "Jugum," or fold at the base of the fore-wings, as in the "Trichoptera," from which the "Lepidoptera" are derived. The two pairs of wings are similar in size and venation, and are fastened to a loose-jointed body.

The "Hepialidæ" are large or very large, known as "ghost-moths," from their peculiar hovering, silent flight, and they are rare in collections. The larvæ are borers, and some of them require several years to come to maturity.

The "Micropterygidæ" are small or very small species. The typical genus "Micropteryx," whose larvæ live on wet moss, does not occur with us, its representative being "Epimartyria" Wlsm. In "Eriocrania" Zell. the larvæ in Europe are leaf-miners. So far no North American species have been bred, but the very large blotch mines and larvæ have been found in abundance in Essex County and Anglesea in May and June on various species of oak, chestnut and birch. The larva is full grown in

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two weeks or less, drops to the ground and spins a tough little cocoon, in which it remains as a larva until the following April. The difficulty of keeping them alive for eleven months explains why so little is known of the life history.

Family HEPIALIDÆ.

STHENOPIS Pack.

S. argenteomaculatus Harr. Caldwell (Cr); Ft. Lee VI (Bt); Newark VI (Sb); larva in roots of alder, and requires three years to mature (Bt).

S. auratus Grt. Very rare near Newark and New York; nothing is known of its early stages.

Besides the above, "*S. quadriguttatus*" Grt., "*Hepialus mustelina*" Pack. and "*H. gracilis*" Grt. are almost certain to occur in New Jersey.

Family MICROPTERYGIDÆ.

ERIOCRANIA Zell.

E. auricyanea Wlsm. Almost certain to occur in New Jersey.

E. griseocapitella Wlsm. Essex Co. IV, 21, V, 4; very rare, occasional on tree trunk or flying in sunshine in open wood.

EPIMARTYRIA Wlsm.

E. auricrinella Wlsm. Essex Co. VI, 3-8; in some abundance in damp, open wood at 4 P. M., near bank of a brook, resting on stems and leaves of grasses or weeds from 6 to 18 inches above the ground; earlier than this and half an hour later not one was to be found.

There is also an undetermined species with Mr. Daecke, taken at Brown's Mills V, 13.

Order HYMENOPTERA.

In this order the adults have four transparent wings with comparatively few veins and cells, the anterior larger than the posterior, the two pairs hooked together in flight, naked or clothed with fine hair, never with scales. The mouth parts are mandibulate, the tongue often developed into a longer or shorter lapping organ. The ovipositor is quite usually modified into a sting, an auger, a saw or a drill depending upon the habits of the insect. The metamorphosis is complete.

This order contains the bees, wasps, ants, saw-flies, ichneumon flies, etc., etc., and is a mixture of beneficial and injurious species, with the former largely in the majority. Since the publication of the previous edition much has been added to our knowledge of this order, and some of the groups have been very thoroughly collected in New Jersey.

The general arrangement of the list is by Mr. Henry L. Viereck, of the U. S. National Museum, who has practically reversed the arrangement proposed by the late Dr. Ashmead, placing the saw-flies at the head rather than the foot of the series, and in general modifying the order of the species within the families in accordance with later studies. Mr. Viereck has added not only many new records, but much information as to food habits of parasitic species, and in general he is to be credited with such notes as are not strictly economic or otherwise credited.

In the ant families Dr. Wm. Morton Wheeler, of Harvard University, has been good enough to prepare the list, and the information as to these interesting species is unusually full. In the gall-flies Mr. Wm. Beutenmuller, of the American Museum of Natural History, has written the list, and this portion also is exceptionally complete.

In the Chalcids Mr. J. C. Crawford, of the U. S. National Museum, has arranged the species to bring the series into accord with his studies. The problem of just what to include in this list among the parasites has been rather a difficult one. Many of the species are small or very small, and some forms are never obtained except by actually breeding them out of their host species. The conclusion finally reached was to include those species that had been bred out of forms occurring not rarely within the State, and in localities that rendered occurrence in New Jersey almost a certainty. A large number of species listed in this way in the last edition have been fully authenticated in the present. It is believed that the addition of these species will stimulate search and study, and I fully expect that nearly all will be actually found within the next decade.

A few names in the last edition will not be found in this, either because the species has proved to be so distributed that its occurrence in New Jersey is not to be expected or because, as in some of Dr. Ashmead's species, the names were never sanctioned by actual description. A few of the mss. names are included, however, to call attention to the occurrence of a species and their status is noted.

In the saw-flies Prof. Alex. D. MacGillivray has looked over the manuscript and has added information and suggestions.

Altogether the list now presents a very fair picture of our Hymenopterous fauna, although even yet far from complete.

PHYTOPHAGA.

The species of this series have little in common save that, with few exceptions, they feed directly or indirectly on vegetable matter; directly when, as with the saw-flies, the entire tissue is eaten; indirectly when, as in the gall-flies, a distortion of growth is caused, upon the secretions of which the larva is nourished.

Super-family TENTHREDINOIDEA.

These are the saw-flies, in which the ovipositor of the female is modified into a pair of plates variably serrated at the edges, working between a pair of sheaths. They are usually rather compactly built but not very hard species, head, thorax and abdomen of nearly equal width, abdomen sessile or united to the thorax for its full width, without trace of stalk, the wings folded over the abdomen when at rest, the secondaries with a broad anal lobe, making them wider than the primaries. The flies are sometimes sluggish and may be picked off the plants on which they rest with the fingers.

The larvæ vary greatly in feeding habits, some forming galls, others living in stems, a few in fruits, many as leaf-miners, some as leaf skeletonizers, while the majority eat openly upon their food plants. In a general way they resemble caterpillars in form; but have at least five pairs of abdominal pro-legs. Many have the habit of characteristically curling up the hind portion of the body while feeding, and quite a number are viscid and slug-like in appearance. They are usually kept in check with arsenical poisons or with white hellebore, dry or in decoction, to which they are peculiarly susceptible. Against some of the slimy forms dry hydrate of lime or even very fine road-dust is satisfactorily available.

Family XYELIDÆ.

ODONTOPHYES Konow.

O. avingrata Dyar. Ft. Lee, Plainfield; on hickory and butternut (Dyar).

MACROXYELA Kirby.

M. infuscata Nort. (*ænea* Nort.) Staten Island III (Ds); larva on leaves of elm.

"*M. ferruginea* Say" will probably not be found in New Jersey, but "*bicolor* MacG." and "*distincta* MacG." are likely to occur.

XYELA Dalm.

X. minor Nort. Riverton IV, 17, Clementon V, 19 (Jn); larva on pine (Dyar).

Dr. MacGillivray says that "*Megaxyela major* Cress." is not likely to occur in New Jersey, and that the record in the last edition was a mis-identification.

Family LYDIDÆ.

In this family collections are very incomplete, and it has been deemed best to omit all species not practically certain to occur in the State.

LYDA Fab.

- L. apicalis* West. Will probably be found in New Jersey.
- L. tessellata* Klug. (*Itycorsia*) Penna., and certainly N. J. as well.

CEPHALEIA Panz.

- C. frontalis* West. (*Liolyda*) Massachusetts to Georgia.
- C. fulviceps* Rohw. Atlantic Co., type locality (Rohwer).
- C. simidea* Cress. Probably occurs in New Jersey.

NEUROTOMA Konow.

- N. fasciata* Nort. (*Lyda cerasi* Riley) Clifton VII, 3 (GG); Trenton VII, 7 (Hk); Newark, Lakehurst VII, 17, Atlantic Co. (Coll); the common web-worm of the wild cherry (Dyar).
- N. inconspicua* Nort. (*Pamphilius*) Larva on cherry in adjacent States.

PAMPHILIUS Latr.

- P. ocreatus* Say. Larva on hazel, "*Corylus*" in a web, solitary (Dyar); sure to be found in New Jersey.
- P. persicus* MacG. Larva feeds on peach leaves, and is almost certain to be found in New Jersey orchards.

BACTROCERUS Konow.

- B. perplexa* Cress. Riverton (Vk).
- B. plagiata* Klug. (*Lyda*) Riverton (Vk); Westville VII, 12 (Jn); Clementon VI, 25 (Hk); Anglesea VII, 25 (Sm).
- B. quebecensis* Prov. Delaware Water Gap (Jn).
- B. rufofasciata* Nort. New Brunswick (Bt).
- B. scripta* Say. Riverton (Vk).

Family TENTHREDINIDÆ.

Sub-family LOPHYRINÆ.

LOPHYRUS Latr.

- L. abbottii* Leach. Springfield, Jamesburg; locally and seasonally common on pine throughout the State (Sm).

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- L. akhurstii* Nort. Described from New Jersey and also a pine feeder.
- L. lecontei* Fitch. Jamesburg V, 15 (Coll); feeds on pine.
- L. abietis* Harr. Larva on black spruce; sure to occur in New Jersey.
- L. fabricii* Leach. Larva on "Pinus rigida" (Dyar).
- L. abdominalis* Say. Lakehurst VIII, 20, Atlantic Co. VIII (Coll); on pine.

Sub-family EMPHYTINÆ.

HEMITAXONUS Ashm.

- H. dubitatus* Nort. Ft. Lee (Dyar); Riverton (Vk); Westville V, 7, Woodbury VI, 7 (Jn); Jamesburg V, 31, Anglesea VII, 25 (Coll); larva on fern "Onoclea."

TAXONUS Hart.

- T. amicus* Nort. Anglesea VII, 25 (Sm).
- T. innominatus* MacG. Merchantville V, 26 (Dke).
- T. nigrisoma* Nort. Long Island, and sure to be found in New Jersey.

PŒCILOSTOMA Dahlb.

- P. ignota* Nort. (*Tetraneura*) Larva g. d. on strawberry; occasionally sent in; but not really injurious anywhere in the State.
- P. convexa* MacG. New Brunswick (Coll).
- P. maculata* Nort. (*Pœcilostomidea*) Throughout the State V-VIII, larva sometimes destructive on strawberry.
- P. coryli* Dyar. On hazel, Van Cortland Park, N. Y., and sure to occur in New Jersey.
- P. evicta* MacG. Sandy Hook, no date (MacG.).

"*P. obscurata* Cress." of last edition was wrongly determined; the species is known only from the Rocky Mountains.

EMPHYTUS Klug.

- E. apertus* Nort. Riverton (Vk).
- E. cinctipes* Nort. The curled rose saw-fly (Dyar). Fort Lee VII, 4 (Dke).
- E. inornatus* Say. Great Notch (GG); New Brunswick IV, 19 (Coll); Trenton VIII, 15 (Hk); Riverton (Vk).
- E. mellipes* Nort. "United States" (Cress).

PARATAXONUS MacG.

- P. multicolor* Nort. (*Aphilodactium*) Greenwood Lake, larva on alder and birch (Dyar); Westville VI, 6, Clementon V, 30 (Jn); Lucaston VI, 14 (Dke); Atlantic Co. (Coll).

ERIOCAMPA Hart.

E. rotundata Nort. Probably occurs in New Jersey.

PSEUDOSIOBLA Ashm.

P. excavata Nort. Westville (Jn); Ocean Co. V (Sm); larva on button-bush "Cephalanthus," often defoliating plants in early spring (Dyar).

MONOSOMA MacG.

M. inferentia Nort. Bred in Long Island IV, 26, from larva on alder (Dyar); Clementon V, 2 (Hk).

MACREMPHYTUS MacG.

M. tarsatus Say. (*Harpiphorus*) Larva on "Cornus" (Dyar) and sure to be found in New Jersey.

M. varianus Nort. Newark (Coll); larva on "Cornus" (Dyar).

M. versicolor Nort. Greenwood Lake, on "Cornus" (Dyar); Trenton VII, 5 (Hk).

STRONGYLOGASTROIDEA Ashm.

S. apicalis Say. Jamesburg VI, VIII, 8 (Coll); Clementon V, 30 (Jn); larva on blackberry (Dyar).

S. epicera Say. "New Jersey" (Coll).

S. mellosus Nort. Clementon V, 30 (Jn).

S. pallidicornis Nort. Merchantville V, 26 (Dke); Clementon (Vk).

S. pallipes Say. (*Hypotaxonus*) Should occur in New Jersey.

S. rufocinctus Nort. (*Parasiobla*) New Hampshire to Virginia (Cress); Long Island VII, 5 (Dke).

S. terminalis Say. Merchantville V, 26 (Dke); Clementon (Vk).

S. uniccinctus Nort. (*Taxonus*) Orange Mts. VIII, 29 (Coll); Merchantville V, 26 (Dke).

DIMORPHOPTERYX Ashm.

D. pinguis Nort. Jamesburg VIII, 8 (Coll); larva on oak, maple, cherry, etc. (Dyar).

Sub-family SELANDRINÆ.

SELANDRIA Leach.

S. flavipes Nort. Jamesburg V, 31, Lahaway VI, 1 (Coll); Riverton V, 16, Westville VI, 6, Atco (Jn); Clementon V, VI (div); Ashland V, 13 (Hk); Lucaston VI, 16, Laurel Springs V, 23 (Dke).

PARASELANDRIA Ashm.

P. decolorata Cress. Atco (Jn).

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STRONGYLOGASTER Dahlb.

- S. longulus* Nort. Westville (Vk).
- S. luctuosus* Prov. New York City, larva on brake (Jl).
- S. tacitus* Say. Shark River VII, 19, Clementon (Jn); Ashland V, 13 (Hk); Brown's Mills V, 31 (Dke).
- S. multicinctus* Nort. Clementon V, 30, Atco V, 4 (Jn).

Sub-family DOLERINÆ.

DOLERUS Jur.

- D. abdominalis* Nort. Caldwell (Cr); Jamesburg V, 31, Lahaway V, 26 (Coll); according to Dyar all larvæ of this genus are grass feeders.
- D. apicalis* Nort. Trenton IV, 29, V, 26 (Hk).
- D. aprilis* Nort. Throughout the State IV, V, not rare.
- D. bicolor* Beauv. New Brunswick IV, 21, Jamesburg V, 31 (Coll); Westville IV, 19 (Jn); Merchantville IV, 23 (Dke); Pemberton V, 10 (GG).
- D. collaris* Say. Jamesburg VI, 4, common on that one day (Sm).
- D. sericeus* Say. Ft. Lee Dist. (Bt); Anglesea V, 30 (Sm).
- D. similis* Nort. Del. Water Gap VII, 12 (Coll); Trenton V, 26 (Hk); Clementon V, 10 (Jn).
- D. apricus* Nort. Trenton V, 21 (Hk).
- D. unicolor* Beauv. (*arvensis* Say. ♀). Paterson IV, 28, found in numbers at dusk, asleep on tall weeds and small willows (Gr); Caldwell (Cr); New Brunswick, g. d. IV (Sm); Riverton (Vk).

LODERUS Konow.

- L. albifrons* Nort. (*Dolerus*) Caldwell (Cr); Ridgewood V, 28 (Coll); Trenton V, 21 (Hk).

Sub-family PHYLLOTOMINÆ.

ENDELOMYIA Ashm.

- E. æthiops* Fab. (*rosæ* Harr). Common wherever roses are grown in New Jersey, and often defaces the foliage seriously.

CALIROA Costa.

- C. fasciata* Nort. (*Eriocampa*) Larva on oak (Dyar).
- C. juglandis* Fitch. (*Eriocampa*) Greenwood Lake, on butternut (Dyar); larva sometimes locally common (Sm); adult unknown (MacG).

C. quercusalba Nort. (*Periclistoptera*) Mass. to Virginia; larva on white oak (Dyar).

C. obsoleta Nort. Burlington Co. (Sm); larva on wild cherry (Dyar).

C. quercuscoccinea Dyar. Mass. and New York, larva on black and scarlet oak (Dyar).

C. limacina Retz. (*cerasi* Peck) The common cherry and pear slug which occurs throughout the State, often in harmful numbers. Easily controlled by the arsenites or even road dust. Feeds also on "Amelanchier" and other plants.

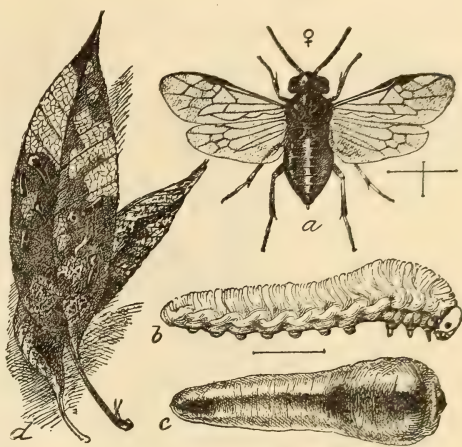


Fig. 237.—Pear slug, *Caliroa limacina*: a, adult; b, c, larva from side and above, all enlarged; d, leaf eaten by larva, natural size.

Sub-family TENTHREDININÆ.

PACHYPROTASIS Hartig.

P. rapæ Linn. (*omega* Nort.) Of general distribution in the United States.

LAGIUM Konow.

L. cinctulum Nort. So. Orange (Bt); Clementon VII, 9 (Hk); DaCosta VII, 19, Iona VII, 13, Manumuskin VI, 23 (Dke).

L. atrovioleaceum Nort. (*Tenthredopsis*) Jamesburg VI, 20, Lahaway VIII, 3 (Sm); Woodbury VIII, 22 (Jn); Clementon VI, VII (div); larva on elder (MacG).

TENTHREDOPSIS Costa.

T. semilutea Nort. New Jersey (Cress); Trenton V, 31 (Hk).

NEOPUS MacG.

N. 14-punctatus Nort. Merchantville VI, 4 (Dke); Clementon (Vk).

TENTHREDO Linn.

T. verticalis Say. (*Tenthredopsis*) Del. Water Gap VII, 11 (Jn), Glassboro VII, 19 (Dke).

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- T. nigricollis* Kirby. Riverton (Vk).
T. angulifera Nort. Delaware Water Gap (Jn).
T. grandis Nort. (Labidia) New York to Virginia (U S N M).
T. lobata Nort. Delaware Water Gap (Jn).
T. rufopecta Nort. Del. Water Gap VIII (div); Caldwell (Cr); New Jersey (Cress).
T. tinctoria MacG. Culver's Lake V, 29 (MacG).

MACROPHYA Dahlb.

- M. epinota* Say. Westville (Jn).
M. externa Say. Caldwell (Cr); Bronx Park on hickory (Dyar).
M. fascialis Nort. Riverton VII, 3 (Jn).
M. flavicoxæ Nort. New Jersey (Cress); larva on elder (Dyar).
M. formosa Klug. Del. Water Gap VII, 9, 12 (div); New Brunswick (Coll), Ft. Lee VII, 4, Merchantville VI, 26, Lucaston V, 30, Iona VI, 2 (Dke); Trenton VII, 8, Anglesea VI, 11 (Hk); Westville (Vk); Clementon VI (div).
M. intermedia Nort. Anglesea (Jn).
M. nigra Nort. Woodbury VI, 27 (Jn).
M. pulchella Klug. var. *alba* MacG. Trenton VI, 13 (Hk).
M. tibiator Nort. Boonton (GG); Trenton V, 24 (Hk); New Jersey (Cress); larva on elder (Dyar).
M. trisyllaba Nort. Del. Water Gap VII, 8 (Jn); Passaic VI, 8 (Coll); Trenton VII, 5 (Hk); New Jersey (Cress); larva on elder (Dyar).
M. trosula Nort. Atlantic County (Sm).
M. bilineata MacG. Del. Water Gap (Jn); Merchantville V, 26 (Dke).
M. minuta MacG. Merchantville V, 26 (Dke).
M. incerta Nort. Jamesburg V, 31 (Coll).
M. crassicornis Prov. Trenton V, 2 (Hk).

ALLANTUS Jur.

- A. basilaris* Say. New Jersey (Coll).

Sub-family CIMBICINÆ.

ABIA Leach.

- A. americana* Cress. Canada to Missouri, larva on honeysuckle.
A. inflata Nort. (Zarea) New Brunswick (Sm); Dr. MacGillivray thinks this is the species listed as "kennicotti" in the last edition.

TRICHIOSOMA Leach.

- T. triangulum* Kirby. G. d.; larva on willow, wild cherry, etc. (Dyar).

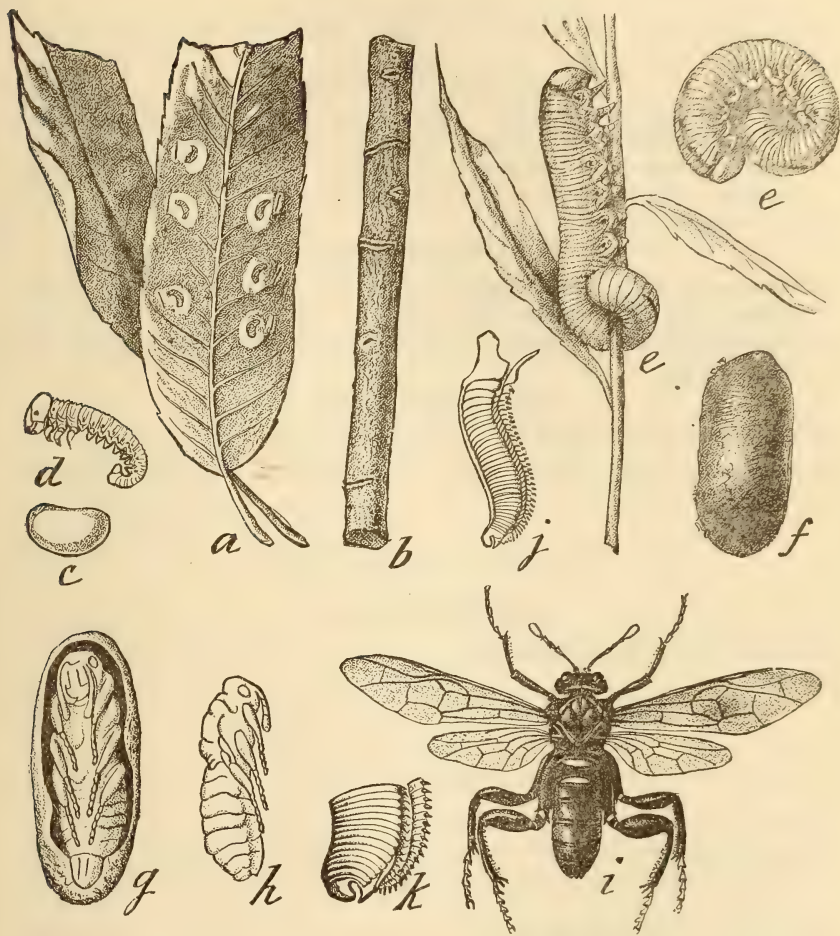


Fig. 238.—Willow saw-fly, *Cimbex americana*: a, willow leaf showing egg blisters; b, twig with girdlings; c, egg, enlarged; d, newly hatched larva, enlarged; e, larvæ; f, cocoon; g, same cut open to show pupa; h, pupa; i, male adult; j, k, ovipositor and its tip, enlarged.

CIMBEX Oliv.

C. americana Leach. Throughout the State, the larva common enough on willow, less so on elm, poplar and linden. The adult is rarely seen and the species has several varieties—"laportei" Lep., "nortoni" MacG., "luctifera" Kirby, and "10-maculata" Nort., most of which probably occur in the State.

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Sub-family HOPLOCAMPINÆ.

HOPLOCAMPA Hartig.

- H. halcyon* Nort. Iona IV, 20 (Dke); larva feeds on shad-bush. The "MacGillivrayella nigridorsum" Ashm. of previous list is a mss. name only and was undoubtedly based on a dark colored individual of this species. The specimen appears to be lost.

OPISTHONEURA Ashm.

- O. albidovaria* Nort. (*Hemichroa*) Bellport, L. I., larva on black oak (Dyar); sure to occur in New Jersey.
- O. phytophagica* Dyar. Larva on white oak in Van Cortland Park, N. Y. City (Dyar).

HEMICHROA Curtis.

- H. americana* Prov. Larva on alder, gregarious, near N. Y. (Dyar).
- H. fraternalis* Nort. Pelham Bay Park, N. Y. City, larva on white oak (Dyar).

Sub-family MONOCTENINÆ.

MONOCTENUS Dahlb.

- M. fulvus* Nort. Great Notch (Dke).

Sub-family CLADIINÆ.

PRIOPHORUS Dahlb.

- P. æqualis* Nort. Probably to be found in New Jersey.
- P. acericaulis* MacG. South Orange V, VI; larva bores into the leaf stem of sugar maple and sometimes causes partial defoliation. Very local.
- P. solitaris* Dyar. Occurs near New York City on alder and wild cherry (Dyar).

CLADIUS Ill.

- C. pectinicornis* Fourc. The larva is general on roses in spring (Dyar), and also feeds on clematis.

Sub-family NEMATINÆ.

GYMNONYCHUS Marlatt.

- G. appendiculatus* Hart. Clementon (Vk); this is the gooseberry saw-fly, which is sometimes locally common and injurious throughout the State.

PACHYNEMATUS Konow.

- P. corniger** Nort. New Jersey (Cress); Riverton (Vk); Merchantville V, 26 (Dke); Clementon IX, 5 (Hk).
P. affinis Marl. Greenwood Lake, larva on grass (Jl).
P. extensicornis Nort. The larva feeds on wheat "throughout the north-eastern United States" (Marlatt).
P. subalbatus Nort. Toms River (Bt).
P. gregarius Marl. (*Micronematus*) Englewood, on smooth-leaved willow (Dyar).

PRISTIPHORA Latr.

- P. idiota** Nort. Orange Mts. VIII, 29, Jamesburg VIII, 8 (Coll); Iona V, 25 (Dke); the larva is said to be an important enemy of cranberry, and this is probably the species that is occasionally found in Atlantic Co.
P. sycophanta Walsh. Orange V, 24 (Coll); larva on willow, birch, "Vaccinium, etc. (Dyar).
P. banksi Marl. Del. Water Gap VII, 7, Clementon V, 16, Atco VI, 13 (Jn); Iona IV, 13 (Hk).
P. tibialis Nort. Long Island, and almost surely New Jersey.

EUURA Newn.

- E. nigra** Prov. Riverton (Vk); all the species are gall-makers on willow (Dyar).
E. salicis-ovum Walsh. Makes a stem gall; near N. Y. City (Bt).

PONTANIA Costa.

- P. pallicornis** Nort. Ft. Lee, folding leaves of smooth-leaved willow (Dyar).
P. pisum Walsh. Makes a pea-like gall on willow leaves, and surely occurs in New Jersey.
P. hyalina Nort. New Jersey (U S N M); makes galls on willow leaves.
P. robusta Marl. Ft. Lee, folding leaves of poplar (Dyar); Clementon VI, 9 (Jn).
P. pomum Walsh. A common gall-maker on bush willow (Bt).
P. gracilis Marl. Makes galls on willow leaves in Van Cortland Park (Dyar).
P. populi Marl. Ft. Lee (Dyar); makes a slight gall, and is a leaf roller on "Populus grandidentata" (Dyar).
P. terminalis Marl. Makes a slight gall, and is a leaf-roller on smooth willow, Van Cortland Park, N. Y. (Dyar).

CRÆSUS Leach.

- C. latitarsus** Nort. Jamesburg V, 31 (Coll); larva gregarious on birch (Dyar).

PTERONUS Jur.

- P. ostryæ* Marl. Ft. Lee, larva on blue beech (Dyar).
P. pinguidorsum Dyar. Monmouth Co., salt meadows VII, 31 (Coll).
P. salicisodoratus Dyar. Trenton VII, 25 (Hk).
P. carpini Marl. Ft. Lee, larva on hop-hornbeam (Dyar).
P. longicornis Marl. Flatbush, L. I., and sure to be found in New Jersey.
P. integer Say. New Jersey (Cress); larva on oak "*Q. tinctoria*" (Dyar).
P. trilineatus Nort. Newark VI, 25, Trenton VIII, 16 (Coll); larva on locust.
P. ribesi Scop. The larva is the common "currant worm," and is found wherever a currant or gooseberry bush grows, often defoliating plantations completely. Arsenical sprays or hellebore act promptly and effectively.
P. erythrogaster Nort. Riverton (Vk).
P. corylus Cress. Chester (Coll); Staten Island VI (Ds); larva gregarious edge feeders on "*Alnus*" (Dyar) and "*Corylus*."
P. ventralis Say. New Jersey (Cress); larva on willow and poplar.
P. cornelli Marl. Staten Island V, VI (Ds).
P. mendicus Walsh. (*Nematus 3-vittatus* Nort.) Larva on Willow, Newark V, New Brunswick V (Coll).
P. hyalinus Marl. Larva on white birch, Riverside Drive, N. Y. (Dyar).
P. quercus Marl. Larva on white oak, Bellport, L. I. (Dyar).

NEMATUS Jur.

- N. chloreus* Nort. Larva on "*Quercus coccinea*," Bellport, L. I. (Dyar).

Sub-family BLENNOCAMPINÆ.

HYPARGYRICUS MacG.

- H. fumipennis* Nort. (*Phymatocera*) New Jersey (Cress); Del. Water Gap, larva on flowers of "*Smilacina*" (Young). This is the "*Melanose-landria zabriskel*" Ashm. of the previous list—a mss. name only.

MONOPHADNUS Hartig.

- M. tillæ* Nort. New Jersey (Cress); Riverton (Vk).

ISODYCTIUM Ashm.

- I. caryicola* Dyar. Fort Lee, on hickory (Dyar).
I. dilutum Cress. Lucaston V, 9 (Dke).
I. subgregarius Dyar. Long Island, on rock oak, "*Q. prinus*" (Dyar), and certain to be found in New Jersey.
I. infrequens Dyar. Larva on white oak on Long Island (Dyar).

PERICLISTA Konow.

- P. emarginata* MacG. New York City on "Quercus coccinea" (Dyar).
P. subtruncata Dyar. New York City on "Quercus coccinea" (Dyar).
P. media Nort. New Jersey; larva a spring slug on white oak (Dyar).
P. albicollis Nort. Larva on black oak at Bellport, L. I. (Dyar).
P. purpuridorsum Dyar. L. I. to D. C.; larva on white oak (Dyar).

TOMOSTETHUS Konow.

- T. inhabilis* Nort. (*Blennocampa*) Flatbush, N. Y., VI, 1, larva on pear (U S N M).
T. bardus Say. (*Monophadnus*) Fort Lee, on ash (Dyar).

MONOPHADNOIDES Ashm.

- M. rubi* Harr. The "raspberry saw-fly," common and locally sometimes very injurious in South Jersey. Arsenites at moderate strength serve as satisfactory remedies.
M. caryæ Nort. The "hickory woolly worm"; quite common in 1897 at New Brunswick, Plainfield and other points.

APHANISUS MacG.

- A. nigrinus* MacG. Riverton (Vk).

ERYTHASPIDES Ashm.

- E. pygmæa* Say. (*Blennocampa*) Generally distributed throughout the State; larva on grape; never harmful in my experience (Sm).

Sub-family FENUSINÆ.

KALIOFENUSA MacG.

- K. ulmi* Lund. Larva mines the leaves of European elms, and certainly occurs in New Jersey.

KALIOSYPHINGA Tischb.

- K. dohrnii* Tischb. (*melanopoda* Cam. = *Fenusa curta* Nort.) Brooklyn Parks; a leaf miner on alder and oak (Dyar).

Sub-family METALLINÆ.

METALLUS Forbes.

- M. rubi* Forbes. Larva mines in the leaves of "Rubus," is injurious in Delaware, and almost certainly occurs in New Jersey.

Sub-family HYLOTOMINÆ.

HYLOTOMA Latr.

- H. abdominalis* Leach. Del. Water Gap VII, 12 (Jn); Lahaway V, 19 (Coll); larva on willow (Dyar).
- H. borealis* Kirby. Delaware Water Gap VII, 8 (Jn).
- H. dulcearia* Say. Monmouth Co. salt marsh VII, 31 (Coll).
- H. eximia* Kirby. Clementon V, 16 (Jn).
- H. humeralis* Beauv. Newark, Lahaway V, 28 (Coll); Jamesburg VI, 16, larva on poison ivy (Dyar); Merchantville VII, 18, Atlantic City VII, 14 (Jn); Pemberton VII, 8 (Hk); Anglesea V, 30-VI, 28 (div).
- H. macleayi* Leach. Del. Water Gap VII, 12 (Coll); Manahawkin VII, 5 (Hk); larva on wild cherry (Dyar), and on Chinese honeysuckle (Vk).
- H. rubiginosa* Beauv. Wenonah VI, 14 (Dke); Lahaway V, 28, Atlantic Co. (Sm).
- H. scapularis* Klug. Boonton (GG); Del. Water Gap VII, 11 (Jn); Caldwell (Cr); Chester VII, 20, Paterson V, 1, Newark V, New Brunswick IV, 21, Jamesburg VII, 4, Anglesea V, 28 (Coll); Trenton VII, 5 (Hk); larva on oak (Dyar).
- H. miniata* Klug. Staten Island (Ds); Riverton VIII, 17, Iona VI, 2, Cape May VIII, 9 (Dke); Malaga VII, 20 (GG); Anglesea VIII, 5 (Hk).
- H. pectoralis* Leach. Laurel Springs V, 23, Manumuskin VI, 25 (Dke); larva on birch (Dyar), and on "Salix nigra" (Sz).

ATOMACERA Say.

- A. ruficollis* Nort. (Micrarge) Del. Water Gap VII, 8 (Jn); Riverton (Vk).
- A. cellularis* Say. (Schizocerus) Larva on sweet potato and almost certain to be found in the State.

Sub-family SCHIZOCERINÆ.

SCHIZOCERUS LePel.

- S. bilineatus* Rohw. Manahawkin IX, 5 (Hk).
- S. privatus* Nort. Riverton, Avalon, the larger sweet potato saw-fly (Vk).
- S. zabriskei* Ashm. Bound Brook IX, 7, New Brunswick VIII, 5, Mercer Co. VI, 25 (Coll).
- S. prunivorus* Marl. Larva on wild cherry, Long Island (Dyar).
- S. ebenus* Nort. The common sweet potato saw-fly; throughout the sweet potato districts; but not injurious.
- S. johnsoni* MacG. Riverton IX, 5 (Jn).

Sub-family ACORDULECERINÆ.

ACORDULECERA Say.

- A. dorsalis* Say. Ft. Lee, larva on young leaves of oak (Dyar); Jamesburg VI, 16 (Coll); Riverton VIII, 14, Clementon V, 9 (Jn). These records probably represent more than one species (Vk).
- A. biclinia* Konow. Ocean County (Sm).
- A. mixta* MacG. Orange VI, 22 (Coll).
- A. maura* MacG. Merchantville (Dke).
- A. saginata* Prov. Riverton (Dke).

Family XIPHYDRIDÆ.

Moderate-sized species with a cylindrical ovipositor and quite a long neck between the head and thorax. Abdomen sessile as in the preceding family.

XIPHYDRIA Latr.

- X. maculata* Say. (*abdominalis* Say.) Ft. Lee (Zabriskie); New Brunswick VI, 15, Milltown V, 27, Lahaway V, 26 (Coll).
- X. erythrogaster* Ashm. Avalon VI, 30 (Jn).
- X. tibialis* Say. New Brunswick IV, 19, Atlantic Co. (Coll).
- X. attenuata* Nort. (*Konowia* = *Brachyxiphus rufiventris* Cress). New Jersey (Cress., Bradley).

Family SIRICIDÆ.

These are the boring types in which the ovipositor is prolonged into a stout auger, the head closely applied to the thorax, the body hard and thoroughly chitinized. Abdomen sessile.

PAURURUS Konow.

- P. cyaneus* Fab. Lahaway IV, 7 (Coll).
- P. nigricornis* Fab. New Jersey (Cress).

SIREX Linn.

- S. albicornis* Fab. Almost sure to occur in New Jersey.
- S. flavicornis* Fab. Occurs with the preceding.
- S. cressoni* Nort., var. *tricolor* Prov. New Jersey (Cress).

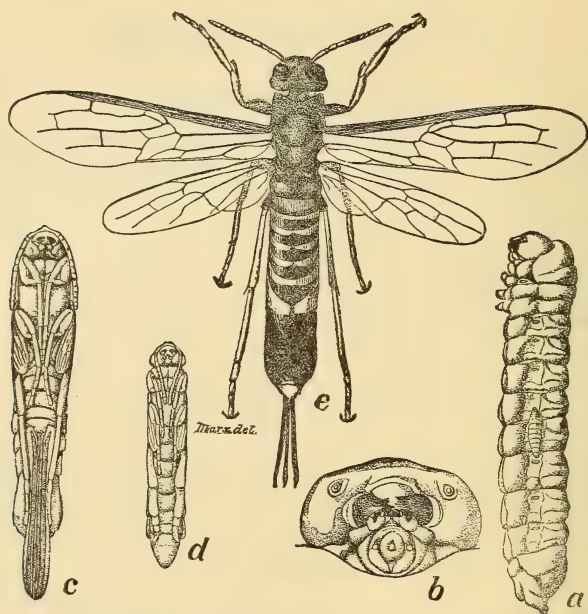


Fig. 239.—The Pigeon Tremex, *T. columba*: a, larva; b, its head enlarged; c, pupa of female; d, pupa of male; e, female adult.

TREMEX Jur.

T. columba Linn. The larva bores into the trunks of a variety of shade and orchard trees throughout the State, IX, sometimes causing considerable injury. It is popularly known as the "Pigeon Tremex," and no practical method of dealing with it is known. It is kept down by parasites, and as it usually attacks only weak or dying trees we can lessen the danger by keeping trees in good condition.

"*T. sericeus*" Say, is now regarded as a variety.

Family CEPHIDÆ.

These are loose-jointed, slender saw-flies of rather soft texture, with long, slender, peculiarly jointed antennæ. The ovipositor is a little produced and the larvæ live in stems of plants and the tender growth of trees and shrubs.

JANUS Steph.

J. integer Nort. (*Cephus*:=*flaviventris* Fitch.) Is the currant stem girdler, the larva tunnelling the pith of the currant. Its work is not rarely seen, but the insects are not common.

- J. abbreviatus* Say. (*Cephus*) Larva bores into stems of willow and surely occurs in New Jersey.

TRACHELUS Jur.

- T. tabidus* Fab. (*Calamenta johnsoni* Ashm.) Riverton V, 29 (Jn).

ADIRUS Konow.

- A. trimaculatus* Say. Trenton VII, 7 (Hk); Hammonton IX, Lahaway VI, 29 (Coll); the larva bores in the stems of blackberry canes, entering at the bottom and eating out the center to the tip.

CEPHUS Latr.

- C. pygmæus* Linn. (*Astatus*) The "wheat stem-borer," an introduced insect which has done considerable injury in New York; but has not yet been actually found in New Jersey. It may be expected at almost any time in the northern counties.

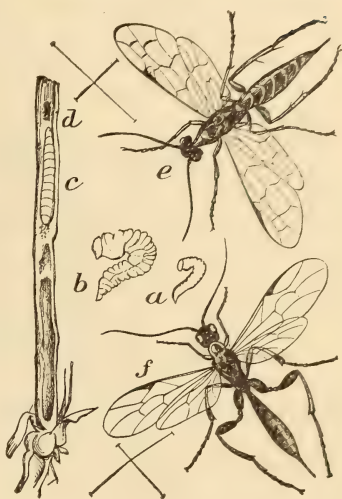


Fig. 240.—Wheat stem-borer, *Cephus pygmæus*: a, larva in outline; b, same, enlarged; c, larva in wheat stalk; e, adult, enlarged; f, a parasite infesting larva, also enlarged.

Family ORYSSIDÆ.

Species in which the antennæ are situated just above the mandibles under a sharp edge; the thorax and abdomen are so closely united as to be almost immobile.

ORYSSUS Latr.

- O. sayi* Westw. Ashland, Long Branch (Jn).
O. terminalis Newn. Long Branch VI, 11 (Jn).

Super-family CYNIPOIDEA.

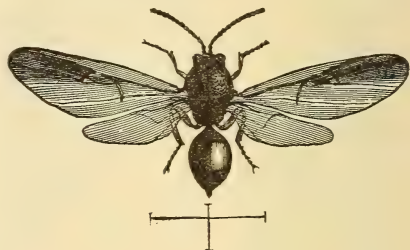
The insects of this series are "gall-wasps" or "gall flies," largely parasitic upon plants, though many of them are true insect parasites. Some also are guests or inquilines, inhabiting galls originally caused by other species. Hence it is not unusual to breed from a large multicellular gall several species of minute Hymenoptera; the true gall-maker in small numbers, the guests and parasites sometimes in great quantity. The galls are abnormal plant growths produced by the irritation of the minute larvæ upon the plant tissue, and each species produces its own peculiar gall, so that classification is possible from these abnormal

growths as from the insects themselves. The grubs do not feed upon the actual gall tissue, but lie in cells, apparently subsisting upon material secreted from the inner walls. A gall may have only one larval cell and is then unicellular, or it may have a great many, and is then multicellular.

The ovipositor in this series is partly coiled within the abdomen, which is usually much dilated and enlarged posteriorly, closely joined to the thorax, but not sessile. The life cycle is often very curious and complicated, and parthenogenesis is of frequent occurrence. In some species there is reason for believing that the males have been completely eliminated, while in others there is an alternation of generations, one having both sexes nor-

normally present, while in the other the females only occur. None of the species are really harmful, nor, in this country, are any of them useful, though in some European countries galls are commercially important.

The completeness of the records in this family is due to the painstaking work of Mr. William Beutenmuller, whose collections in the vicinity of New York City are models of thoroughness. Only those species are included that have been actually found in New Jersey, or whose distribution in connection with the food plant makes it almost certain that careful collection will demonstrate its presence.



An oak gall-fly.

Fig. 241.

Family FIGITIDÆ.

Contains those species that are parasitic in most instances.

EUCÆLIDIA Ashm.

E. canadensis Ashm. (*Figites*) Long Island, and almost surely New Jersey.

SOLENASPIS Ashm.

S. armatus Say. New Jersey (Ashm).

EUCÆLA Westw.

E. pedata Say. New Jersey district.

E. stigmata Say. Jamesburg VII, 15 (Sm).

E. impatiens Say. (*Psilodera*) Jamesburg VII, 15 (Sm).

ALLOTRIA Westw.

- A. avenæ** Fitch. New Jersey district.
A. tritici Fitch. New Brunswick V, 20 (Sm).
A. brassicæ Ashm. Parasitic on the common cabbage louse.

COTHONASPIS Ashm.

- C. erythropus** Ashm. Jamesburg VI (Sm).

Family **CYNIPIDÆ**.

Contains those species, the majority of which are true gall makers.

Sub-family **SYNERGINÆ**.**PERICLISTUS Först.**

- P. sylvestris** O. S. Greenwood Lake, Ft. Lee, Lakehurst, Toms River, from gall of "*Diastrophus nebulosus*" (Bt); New Brunswick (Sm).
P. pirata O. S. Staten Island (Bt Ds), from gall of "*Rhodites globuloides*" (Bt).

CEROPTRES Hart.

- C. petiolicola** O. S. Ft. Lee (Bt); Staten Island (Ds); from gall of "*Andricus petiolicola*" (Bt).
C. tuber Fitch. Ft. Lee (Bt); New Brunswick, Monmouth Junction IV, 8, and quite generally throughout the State (Sm).
C. pisum Fitch. Greenwood Lake, Orange Mts., Ft. Lee, Carlstadt, Lakehurst; from gall of "*Acraspis pezomachoides*" (Bt).
C. ficus Fitch. Ft. Lee, Carlstadt, Lakehurst (Bt); Staten Island (Ds); New Brunswick (Sm); from gall of "*Biorhiza forticornis*" (Bt).
C. inermis Walsh. Ft. Lee, from gall of "*Cecidomyia pilulæ*" (Bt).

SYNERGUS Hart.

- S. campanula** O. S. Ft. Lee, from gall of "*Holcaspis globulus*" (Bt).
S. læviventris O. S. Ft. Lee, from galls of "*Amphibolips confluens*" and "*Holcaspis centricula*" (Bt); New Brunswick (Sm).
S. lana Fitch. Lakehurst (Ds).
S. lignicola O. S. Greenwood Lake, Ft. Lee, Carlstadt, from galls of "*Callirhytus cornigerus*" and "*C. punctatus*" (Bt).
S. oneratus Harris. Ft. Lee, Lakehurst, from galls of "*Holcaspis globulus*" (Bt); New Brunswick (Sm).

Sub-family CYNIPINÆ.

PHILONYX Fitch.

- P. fulvicollis* Fitch. New Jersey district (Ashm).
P. gillettei Bass. New Jersey district; galls on leaves of white oak (Bt).
P. nigricollis Fitch. New Jersey district (Ashm).
P. macrocarpæ Bass. New Jersey district (Ashm); makes galls on leaves of "Q. macrocarpa" and "undulata" (Bt).
P. prinoides Bt. Lakehurst, Toms River, galls on leaves of "Q. prinoides" (Bt).
P. hirta Bass. Ft. Lee, galls on leaves of "Q. prinus" VIII, IX (Bt).
P. pezomachoides O. S. Throughout the State; galls on leaves of white oak, "Quercus alba," VIII-X (Bt).
P. erinacei Walsh. Common and g. d. throughout the State; galls on leaves of white oak VIII-X (Bt).
P. nigra Gill. New Jersey, on white, burr and dwarf chestnut oak.

ZOPHEROTERAS Ashm.

- Z. vaccinii* Ashm. Canada to Florida (Ashm); galls on leaves of post oak, "Quercus minor" (Bt).

BIORHIZA Westw.

- B. forticornis* Walsh. (Xanthoteras) Common and g. d. throughout the State; galls on branches of young white oak, "Q. alba," VIII-X (Bt).
B. mellea Ashm. Lakehurst, on post oak.

NEUROTERUS Hart.

- N. noxiosus* Bass. Ft. Lee; galls on terminal twigs of swamp white oak, "Q. platanoides" (Bt); Staten Island (Ds); New Brunswick (Sm).
N. verrucarum O. S. Lakehurst, Toms River; galls on leaves of post oak, "Q. minor" (Bt).
N. floccosus Bass. (*exiguissimus* Bass.) Common and g. d. throughout the State; galls on underside of leaves of white and swamp white oak (Bt).
N. favosus Bass. Staten Island (Ds); Ft. Lee; galls on leaves of swamp oak, "Quercus palustris" (Bt).
N. irregularis O. S. (*Dolichostrophus*) New Jersey (Ashm); galls on leaves of post oak (Bt).
N. batatus Fitch. Common and g. d. throughout the State; galls on twigs of young white oak shoots (Bt).
N. umbilicatus Bass. Ft. Lee, Staten Island; galls on underside of leaves of swamp white oak "Quercus platanoides" (Bt).
N. pallidus Bass. "New Jersey"; galls on clusters at or near end of the aments of swamp white oak, V (Bt).
N. exiguus Bass. Lakehurst, galls on flower clusters of post oak (Bt).

- N. minutus** Bass. "New Jersey"; galls on petiole of leaf of white oak, IV, V (Bt).
N. majalis Bass. "New Jersey"; galls on leaves of white and rock chestnut oak, "*Q. alba*" and "*Q. prinus*" V, VI (Bt).
N. vesiculus Bass. (*affinis* Bass.) "New Jersey"; galls on buds of white oak and scrub chestnut oak IV, V (Bt).
N. gillettei, Bass. Lakehurst, galls on petioles and midribs of leaves of post oak (Bt).
N. pallipes Bass. "New Jersey"; galls on very young leaves of white oak (Bt).
N. tectus Bass. "New Jersey"; galls on scrub chestnut oak (Bt).
N. distortus Bass. "New Jersey"; galls on branchlets of swamp white oak, "*Q. platanoides*"; V (Bt).

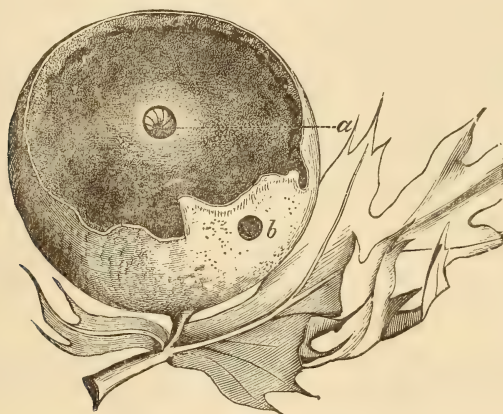


Fig. 242.—*Cynips q-spongifica*, gall on oak; *a*, larva in its cell; *b*, point of exit.

- N. niger** Gillette. (*perminimus* Bass.) Ft. Lee Dist.; galls on leaves of burr and swamp white oak (Bt).
N. papillosus Beut. Bronx Park, N. Y., on swamp white oak (Bt), and sure to occur in New Jersey.

LOXAULUS Mayr.

- L. mammula** Bass. New Jersey Dist. (Ashm); galls on branches of white oak, "*Q. alba*" (Bt).

DRYOPHANTA Först.

- D. lanata** Gill. Ft. Lee Dist.; galls on underside of leaves of red and scarlet oak, "*Q. rubra*" and "*Q. coccinea*" IX, X (Bt).
D. carolina Ashm. Ft. Lee Dist., Lakehurst; galls on under side of leaves of white and scrub chestnut oak VIII, IX (Bt).
D. gemmula Bass. New Jersey Dist.; galls on buds and flowers of scrub chestnut oak "*Q. prinoides*" V, VI (Bt).

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- D. *pedunculata* Bass. New Jersey Dist.; galls on leaves of red and scarlet oak, "*Q. rubra*" and "*Q. coccinea*" (Bt).
- D. *ignota* Bass. New Jersey Dist.; galls on underside of leaves of swamp white oak, "*Q. platanoides*" (Bt).
- D. *longicornis* Bass. New Jersey Dist.; galls on tender shoots of post oak "*Q. minor*" (Bt).
- D. *papula* Bass. New Jersey Dist.; Toms River; galls on leaves of red, scarlet and black oak, "*Q. rubra*," "*coccinea*," "*velutina*" (Bt).
- D. *polita* Bass. Jamesburg (Ds); Lakehurst, Toms River; galls on leaves of post oak, "*Q. minor*" VIII, IX (Bt).

HOLCASPIS Mayr.

- H. *fasciata* Bass. Ft. Lee, Lakehurst, galls on twigs of red and scrub oak, "*Q. rubra*" and "*nana*," IX (Bt); Staten Island, on black Jack oak, "*Q. marylandica*" (Ds).
- H. *globulus* Fitch. Common and g. d. throughout the State; galls on small twigs of white oak (Bt).
- H. *rugosa* Bass. Lakehurst, Toms River; galls on twigs of scrub chestnut oak "*Q. prinoides*" (Bt).
- H. *centricola* O. S. Lakehurst, Toms River; galls on leaves of post oak VIII, IX (Bt, Ds).
- H. *duricoria* Bass. Staten Island (Ds); Greenwood Lake, Ft. Lee, Carlstadt and probably g. d.; galls IX-VI on branches of white oak (Bt).

CYNIPS Linn.

- C. *strobilana* O. S. Del. Water Gap VII (Sm); Staten Island (Ds); Ft. Lee, galls on terminal twigs of swamp white oak IX (Bt).

AMPHIBOLIPS Reinh.

- A. *confluens* Harris. Throughout the State V, VI; makes galls on leaves of red, black and scarlet oak (Bt).
- A. *inanis* O. S. Del. Water Gap VII, 9 (Jn); Staten Island (Ds); Ft. Lee, galls on leaves of scarlet and red oak, "*Q. coccinea*" and "*rubra*" V, VI (Bt).
- A. *ilicifolia* Bass. Staten Island (Ds); Vineland, Lakehurst, Toms River V, VI; galls on leaves and petioles of scrub oak (Bt).
- A. *cœlebs* O. S. Staten Island, Farmingdale, Manasquan V, VI, galls on leaves of scarlet oak, "*Q. coccinea*" (Ds).



Fig. 243.—*Amphibolips inanis*: gall showing the rayed structure.

- A. *cookii* Gill. Staten Island (Ds); Ft. Lee, Lakehurst IX; galls on buds of red and black oak (Bt).
- A. *tinctoria* Ashm. Manasquan ; gall in axils of leaves of scarlet oak (Ds).
- A. *globulus* Beut. Lakehurst; galls on leaves of black Jack oak (Bt).
- A. *nubilipennis* Harr. Ft. Lee VI; galls on leaves of red and black oak (Bt).
- A. *prunus* Walsh. Throughout the State VIII, IX; galls on acorn cups of red and scrub oak, "Q. rubra" and "nana" (Bt).

CALLIRHYTIS Först.

- C. *clavula* Bass. G. d. throughout the State; galls on terminal twigs of white oak (Bt).
- C. *cornigera* O. S. Ft. Lee, Greenwood Lake, Carlstadt, g. d. (Bt); Staten Island (Ds); galls on branches of pin oak, "Q. palustris" (Bt).
- C. *operator* O. S. Staten Island (Ds); galls on catkins and terminal twigs of scrub oak V, VI (Bt).
- C. *seminator* Harr. Throughout the State; galls on twigs of white oak.
- C. *futilis* O. S. Throughout the State, VI, VII; galls on leaves of white oak.
- C. *papillatus* O. S. (*Andricus*) Ft. Lee VI, galls on leaves of rock chestnut oak (Bt).
- C. *punctata* Bass. Local throughout the State; galls on branches of black Jack and red oak (Bt).
- C. *tubicola* O. S. Lakehurst; gall on post oak VIII, IX (Bt).
- C. *similis* Bass. Staten Island (Ds); Lakehurst, Toms River, galls at ends of twigs of scrub oak (Bt).
- C. *palustris* O. S. Throughout the State; galls, V, VI, on leaves of red, black and pin oak (Bt).
- C. *saccularis* Bass. Ft. Lee Dist.; galls on leaves of scarlet oak (Bt).
- C. *pulchra* Bass. New Jersey Dist.; galls on aments of red and black oak (Bt).
- C. *seminiosa* Bass. Ft. Lee Dist., Staten Island; galls on branches of red oak (Bt).
- C. *radicis* Bass. New Jersey Dist.; galls on trunk near root of white oak (Bt).
- C. *capsula* Bass. Lakehurst (Ds); galls on leaves of swamp white oak, "Q. platanoides" V, VI (Bt).
- C. *nigræ* O. S. Ft. Lee Dist.; galls on underside of leaves of black Jack oak, "Q. marylandica" (Bt).
- C. *tumifica* O. S. Ft. Lee Dist.; galls on midrib of red and black oak V, VI (Bt).
- C. *clarkei* Bass. New Jersey Dist.; galls on sterile flowers of scrub oak, "Q. nana" IV, V (Bt).

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- C. tuberosa* Bass. New Jersey Dist.; galls on shoots of scrub oak V, VI (Bt).
C. scitula Bass. New Jersey Dist.; galls on branches of black oak (Bt).

ANDRICUS Hart.

- A. piger* Bass. Ft. Lee Dist.; galls on midribs of leaves of black oak (Bt).
A. atropus Ashm. Lakehurst VIII, IX; galls on buds of post oak (Bt).
A. coronus Beut. Ft. Lee Dist. V; galls on twigs of pin and red oak (Bt).
A. frondosus Bass. Lakehurst VIII, IX; galls on terminal twigs of scrub oak (Bt).
A. davisii Beut. Lakehurst IX, the type locality (Bt Ds); Tuckerton (Ds); Toms River, galls on branches of scrub oak (Bt).
A. topiarius Ashm. Lakehurst VIII, IX; galls on buds of post oak (Bt).
A. piperoides Bass. Ft. Lee Dist. IX, X; galls on midrib of leaves of red oak (Bt).
A. pruinus Bass. New Jersey Dist. V, VI; galls on leaves or sterile stamens of post oak (Bt).
A. exiguus Bass. New Jersey Dist. V, VI; galls on the aments of post oak (Bt).
A. utriculus Bass. New Jersey Dist.; galls on leaves of white oak (Bt).
A. ostensackenii Bass. Ft. Lee, Lakehurst V, VI; galls on leaves of scrub and scarlet oak (Bt).
A. singularis Bass. Staten Island (Ds); Ft. Lee V, VI; galls on leaves of red oak "Q. rubra" (Bt).
A. chinquapin Fitch. New Jersey Dist. (Ashm); galls on leaves of swamp white oak (Bt).
A. fusiformis O. S. New Jersey Dist. (Ashm); galls on leaves of white oak (Bt).
A. flocci Walsh. Throughout the State VIII-X; galls common on the underside of the leaves of white oak (Bt).
A. petiolicola Bass. Throughout the State; galls on petiole, base of leaf or midrib of "Q. platanoides," "prinus," "alba" and "minor" (Bt).
A. pattoni Bass. Staten Island (Ds); Lakehurst, galls on leaves of post oak (Bt Ds).

SOLENOZOPHERIA Ashm.

- S. vaccinii* Ashm. Ft. Lee, Carlstadt, Jamesburg, Lakehurst, Toms River VIII-V; galls on huckleberry sp. (Bt); Staten Island (Ds).

GONASPIS Ashm.

- G. potentillæ* Bass. Common and g. d.; galls in leaf axils of "Potentilla canadensis" (Bt).

DIASTROPHUS Hart.

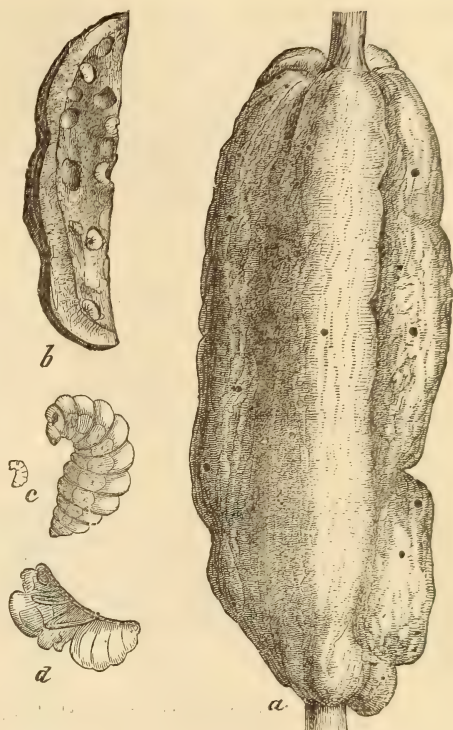
- D. niger* Bass. Staten Island (Ds); Ft. Lee, rare, galls on stems of "Potentilla canadensis" (Bt).
D. minimus Bass. Ft. Lee, rare, galls on stems of "P. canadensis" (Bt).

D. nebulosus O. S. Common throughout the State; galls VIII-VI, on stalks of blackberry, "*Rubus villosus*" (Bt).

D. cuscutæformis Harr. Locally common throughout the State, galls on stems of blackberry "*Rubus villosus*" (Bt).

D. radicum Bass. Throughout the State, locally common; galls at roots of black, raspberry and dewberry (Bt); rarely occurs in cultivated fields, and never as an injurious form.

D. bassettii Beut. Ft. Lee Dist., Lakehurst, galls on stem at root of dewberry, "*R. canadensis*" (Bt); Staten Island (Ds); Riverton IV (Dke).



AULAX Hart.

A. similis Bass. (*Diastrophus*) Alpine VI, not common; galls on stems and leaves of ground ivy, "*Nepeta glechoma*" (Bt).

A. podagræ Bass. Staten Island; galls on wild lettuce VIII-VI (Bt).

A. tumidus Bass. (*Aulacidea*) Local throughout the State; gall on stalk of wild lettuce, "*Lactuca canadensis*" (Bt).

A. mulgedicola Ashm. (*Aulacidea*) New Jersey Dist. (Ashm); gall in pith of wild lettuce "*Mulgedium acuminatum*" (Bt).

RHODITES Hart.

R. semipiceus Harr. Ft. Lee; galls on roots of "*Rosa lucida*," "*carolina*" and "*rubiginosa*" (Bt).

R. radicum O. S. Staten Island (Ds); Ft. Lee, galls on roots of "*R. carolina*" (Bt).

R. rosæfolii Chll. Ft. Lee Dist., galls on leaves of "*Rosa lucida*" (Bt).

R. nebulosus Bass. Staten Island (Ds); Ft. Lee Dist., galls on leaves of "*Rosa lucida*" and "*rubiginosa*" (Bt).

R. globuloides Beut. Staten Island (Ds); Ft. Lee Dist., galls on stems of "*Rosa carolina*" (Bt).

Fig. 244.—Blackberry knot gall, *Diastrophus nebulosus*: a, gall showing exit holes of adult, natural size; b, section through same showing the cells; c, larva, enlarged; d, pupa, enlarged.

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- R. dichlocerus* Harr. Caldwell (Cr); Ft. Lee Dist., gall on stem of "*Rosa carolina*" (Bt); Staten Island (Ds).
R. ignotus O. S. Ft. Lee Dist., galls on leaves and petiole of "*Rosa blanda*," "*carolina*" and "*nitida*" (Bt); Staten Island (Ds).
R. rosæ Linn. Throughout the State, local; gall on "*R. rubiginosa*" (Bt).
R. vernus O. S. Staten Island (Ds); gall on stem of "*R. lucida*" (Bt).
R. bicolor Harr. Throughout the State; gall on stem of "*R. carolina*" (Bt).

Family IBALIIDÆ.

IBALIA Latr.

- I. ensigera* Nort. New Jersey district (Ashm).
I. maculipennis Hald. Fort Lee district (Bt).

HETEROPHAGA.

The species of this series vary greatly in their habits and appearance, but none of them have the abdomen sessile or united for its full width to the thorax, and none of them feed openly upon vegetation by devouring plant tissue. There are collectors of plant products, like honey and pollen, and some feeders in stems and seeds, but the latter habit is rather exceptional.

Super-family ICHNEUMONOIDEA.

Contains moderate sized species on the whole, the wings with a well-arranged series of veins, antennæ not elbowed, ovipositor attached before the end of the abdomen and sometimes very long. As a whole, parasitic on other insects.

In this and the other series of parasitic forms the actual records are not always as full and satisfactory as they might be. Many species are never obtained unless actually bred from their hosts, and by no means all the host species in New Jersey have been bred. It has been deemed advisable, therefore, to include those species of wide distribution bred from host insects which are actually known to occur with us. The rule is that a native parasite has the same distribution as its host, and, while there are many exceptions to this, they will hardly be among such species as are included here.

Family STEPHANIDÆ.

STEPHANUS Jur.

- S. cinctipes* Cress. Pennsylvania and New York, and sure to occur in New Jersey.
S. rufipes Say. (Megischus) Pennsylvania and probably New Jersey.

Family BRACONIDÆ.

APHIDIUS Nees.

- A. phorodontis* Ashm. Parasite on plum louse, "Phorodon mahaleb."
A. nigriceps Ashm. New Jersey probably (Ashm).
A. obscuripes Ashm. New Jersey probably (Ashm).
A. bicolor Ashm. Riverton V, 13 (Jn).
A. americanus Ashm. Parasite on the wheat louse, "Siphonophora avenæ."
A. brunneiventris Ashm. Also parasitic on wheat louse.
A. pterocomæ Ashm. Parasite on "Pterocoma salicicola."
A. ribis Ashm. A parasite on the currant louse.

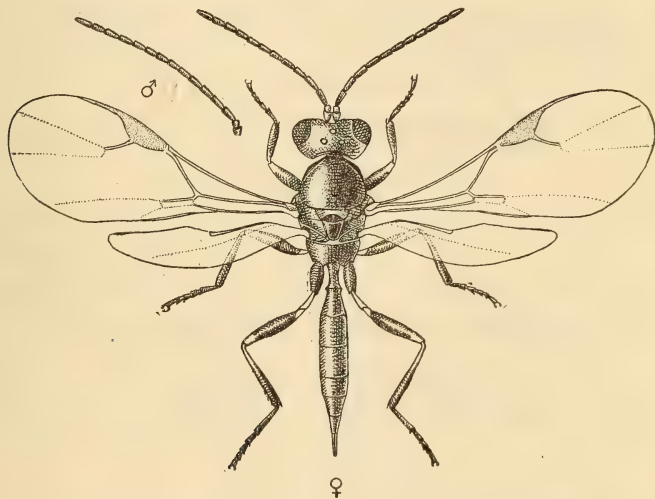


Fig. 245.—*Lysiphlebus tritici*, parasite of the spring grain-aphis: female adult and antenna of male; greatly enlarged.

- A. ribaphidis* Ashm. (*Lysiphlebus*) A parasite on currant louse.
A. citraphis Ashm. Bred from rose louse, "Siphonophora rosæ."
A. myzi Ashm. Parasitic on "Myzus ribis," a currant louse.
A. persicaphidis Ashm. Bred from cherry louse, New Brunswick VI, 22.
A. salicaphis Fitch. (*Adialytus*) Parasite on a willow plant louse.
A. populaphis Fitch. Parasitic on a poplar plant louse.
A. rapæ Curt. (*Lipolexis*) Parasitic on cabbage louse.

TRIOXYS Halid.

- T. rhagii* Ashm. Ridgewood, reared from "Rhagium lineatum" XI, 16 (U S N M). Mr. Viereck thinks this host record an error, and that there must have been some plant louse associated with the material from which this specimen was bred.

PRAON Halid.

- P. avenaphis** Fitch. (*Aphidius*) Throughout South Jersey, parasitic on the common wheat louse (Sm).
P. cerasaphis Fitch. Parasite of cherry plant louse.

OPIUS Wesm.

- O. anthomyiæ** Ashm. (*Biosteres*) Parasitic on an "Anthomyid," mining leaves of Dock.
O. floridanus Ashm. (*Desmiostoma*) New Brunswick VII (Sm); a mss. name only.
O. sanguineus Ashm. Reared from "Trypetids," living in galls on "Solanum carolinense."

ZELE Halid.

- Z. uniformis** Prov. New York and probably New Jersey (Ashm); 1 spec. without locality label is in Coll.
Z. truncator Say. New York and probably New Jersey (Ashm).

MACROCENTRUS Curt.

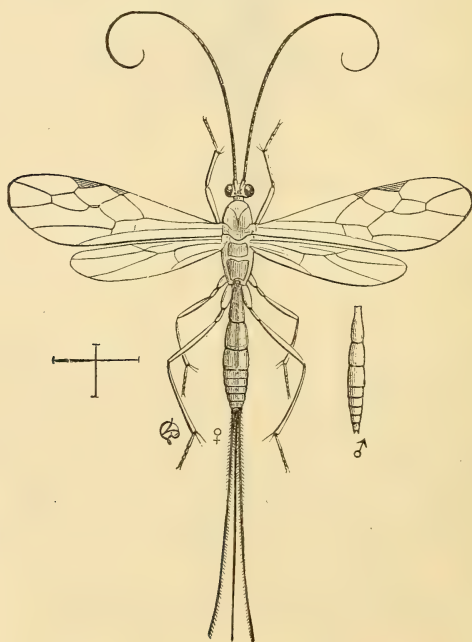


Fig. 246.—Codling moth parasite, *Macrocentrus delicatus*: enlarged.

- M. delicatus** Cress. Throughout the State; a parasite on the codling moth, "*Cacœcia fervidana*" and other Tortricid larvæ, "*Acronyeta obliqua*," etc.

M. crambi Ashm. (*Amicoplus*) Philadelphia V, 1 (Jn); parasite on "Crambus zeellus," a corn root web-worm, which is common in New Jersey.

M. solidaginis Ashm. Reared from "*Cacœcia fervidana*," and from a gall maker in *Solidago*; a mss. name.

M. nuperus Cress. New York (Ashm), and probably New Jersey; a parasite on "*Crambus zeellus*."

EUMACROCENTRUS Ashm.

E. americanus Cress. Canada to Virginia (Cress).

HELCON Nees.

H. ligator Say. Camden VI, 17 (Jn).

H. dentipes Brulle. Parasitic on the longicorn beetles, "*Callidium æreum*," "*Rhopalophora longipes*" and "*Curius dentatus*."

GYMNOSCELUS Först.

G. pedalis Cress. New York and probably New Jersey (Ashm).

CARDIOCHILES Nees.

C. abdominalis Say. Long Island and probably New Jersey (Ashm).

C. tibiator Say. Riverton VIII, 14 (Jn).

C. apicalis Cress. Del. Water Gap VII, 15 (Jn); Atco VII, 4 (Sz).

C. populator Say. (*Cenocœlius*) Common and widely distributed (Ashm).

ICHNEUTES Nees.

I. fulvipes Cress. New York and probably New Jersey (Ashm).

CENTISTES Halid.

C. americanus Riley. Parasitic on lady-bird beetle, "*Megilla maculata*."

BLACUS Nees.

B. orchesiæ Ashm. Parasitic on the beetle "*Orchesia castanea*."

B. gelechiæ Ashm. (*Orgilomorpha*) Bred from "*Gelechia prunifoliella*."

B. lithocolletidis Ashm. Bred from "*Lithocolletis hamadrya*" (Ashm).

B. lactucaphis Fitch. (*Pygostolus*) Parasite of lettuce plant louse.

PYGOSTOLUS Halid.

P. americanus Ashm. A parasite of the Hessian fly.

CALYPTUS Halid.

C. magdali Cress. (*Leiphron*) Parasitic on "*Magdalis olya*."

C. major Cress. New York and probably New Jersey (Ashm).

EUBADIZON Nees.

- E. americanus** Cress. Described from New Jersey (Cress).
E. phymatodis Ashm. (*Leiophron*) Bred at New Brunswick from larva of "*Phymatodes amœnus*" (Sm).

METEORUS Halid.

- M. communis** Cress. Del. Water Gap VII, 1, Jamesburg VII, 4 (Jn).
M. dimidiatus Cress. Parasitic on the common cut worm, "*Agrotis subgothica*," and widely distributed.
M. vulgaris Cress. New Jersey (Cress. Coll); parasitic on "*Omphalocera cariosa*" and "*Tetralopha platanella*."
M. indigator Riley. New Brunswick VII, 20 (Sm); Jamesburg (Coll); parasitic on "*Acrobasis juglandis*" and "*Pionea rimosalis*."

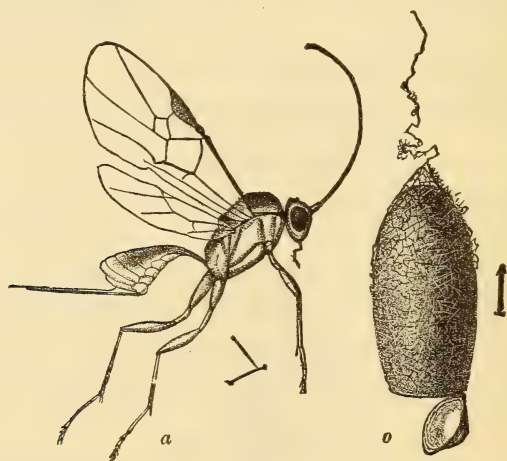


Fig. 247.—*Meteorus hyphantriæ*, parasite on fall web-worm, and its cocoon: enlarged.

- M. hyphantriæ** Riley. Common parasite of the fall web-worm and white-marked tussock moth.
M. orchesiæ Ashm. Reared from "*Orchesia castanea*" and "*Mycetochares binotata*."
M. palliditarsis Cress. (*Zemiotes*) Cramer Hill V, 21 (Jn); type locality New Jersey.

MICROTONUS Wesm.

- M. americanus** Ashm. Jamesburg (Sm); a Mss. species.

PERILITUS Nees.

- P. americanus** Riley. Parasitic on "*Megilla maculata*."

P. gastrophysæ Ashm. Parasitic on "*Gastrophysa cyanea*."

P. hopkinsi Ashm. Reared from "*Polygraphus rufipennis*."

EUPHORUS Nees.

E. mellipes Cress. (*Persistenus*) New Jersey (Cress).

E. sculptus Cress. (*Dinocamptus*) New Jersey probably (Ashm).

MYIOCEPHALUS Marsh.

M. laticeps Prov. (*Loxocephalus boöps*) Long Island and probably New Jersey.

EARINUS Wesm.

E. limitaris Say. Staten Island IV (Ds); New York, common (Ashm).

MICRODUS Nees.

M. agilis Cress. Jamesburg VII, 15, also bred from plum curculio and "*Cacœcia fervidana*" (Coll).

M. annulipes Cress. Jamesburg, Woodbury VI, 27 (Jn).

M. earinoides Cress. Parasitic on bud-moth, "*Coleophora cinderella*" and "*Eccopsis malana*."

M. imitatus Cress. New Jersey (Cress Coll).

M. simillimus Cress. New Jersey (Cress Coll); reared from "*Pædisca strenuana*" and "*Lixus scrobicollis*."

M. johnsoni Ashm. Jamesburg (Jn); a mss. name.

M. texanus Cress. Cramer Hill VI, 11, Westville VI, 27 (Jn).

M. solidaginis Ashm. (Mss) Riverton IX, 5, Clementon V, 30 (Jn).

M. laticinctus Cress. Parasite on bud moth, "*Tmetocera ocellana*."

M. sanctus Say. Jamesburg, from "*Botis feudalalis*" (Coll); also parasitic on "*Nisoniades juvenalis*" and "*Pholisora catullus*."

ELASMOSOMA Ruthe.

E. pergandei Ashm. In nests of "*Camponotus melleus*."

AGATHIS Latr.

A. tibiator Prov. New York and probably New Jersey (Ashm).

A. rubripes Cress. New York and probably New Jersey (Ashm).

A. perforator Prov. (*Microdus*) New York, Pennsylvania and surely New Jersey as well.

A. exorata Cress. Parasitic on the common garden web-worm.

A. liberator Brullé. (*Cretnops*) Trenton VII, 5 (Hk).

A. hæmatodes Brullé. (*Cretnops*) New Jersey (Cress Coll).

A. vulgaris Cress. (*Cretnops*) Caldwell (Cr); New Brunswick (Sm).

A. semirubra Brullé. Clementon V, 30 (Jn); New Jersey (Cress).

MICROGASTER Latr.

M. carinata Pack. A parasite of the "atalanta" butterfly.

M. gelechiæ Riley. Woodbury VI, 27 (Jn); reared from "Gelechia gallæsolidaginis," which is locally common in New Jersey.

M. mellipes Say. (*Orgilus*) Atco VI, 13 (Jn).

M. nephopteris Pack. Parasitic on "*Vitula edmandsii*." Fig. 248.—*Microgaster* species.

M. maculipennis Cress. Anglesea IX, 9 (Vk).

M. zonaria Say. (*Hypomicrogaster*) New York and probably New Jersey (Ashm).

M. rubricoxa Prov. (*Hygroplitis*) Long Island and probably New Jersey (Ashm).

M. brevicauda Prov. (*Dioleogaster*) New York (Ashm); Philadelphia VIII, 25 (Jn), and surely occurs in New Jersey.



Fig. 249. — Caterpillar covered with cocoons of *Microgaster*.

MICROPLITIS Först.

M. gortynæ Riley. Reared from stem borers, "Achatodes" and "Hydræcia."

M. ceratomiæ Riley. Newark, New Brunswick (Coll); reared from Sphingid larvæ.

M. bicolor Ashm. Avalon VI, 30 (Jn); a mss. name.

M. mamestræ Weed. Parasite on larva of "*Mamestra picta*."

M. hyphantriæ Ashm. One of the parasites of the fall web-worm.

APANTELES Först.

Sub-genus **PROTAPANTELES** Ashm.

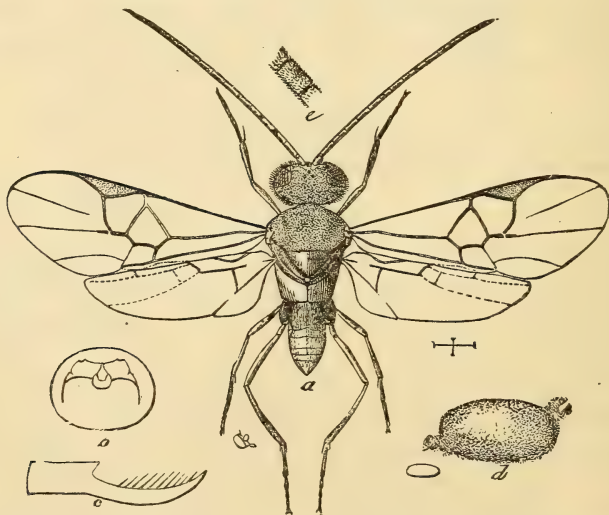


Fig. 250.—*Apanteles aletia*, parasite of the cotton moth, introduced to show the appearance of the insects.

- A. limenitidis* Riley. Philadelphia (Ashm), and probably New Jersey; parasitic on "*Limenitis archippus*." The variety "*flaviconche*" Riley is also on the army worm.
- A. lunatus* Pack. Parasitic on larva of "*Papilio*."
- A. scitulus* Riley. Parasite on "*Spilosoma virginica*."
- A. acronycta* Riley. New Jersey; bred from larva of "*Acronycta*" sp. (Sm).
- A. smerinthi* Riley. New Brunswick (Sm); parasitic on *Smerinthid* larvæ.
- A. xylinus* Say. New Brunswick, reared from "*Smerinthus geminatus*" (Sm); also on "*Spilosoma virginica*" and "*Pionea rimosalis*."
- A. argynnidis* Riley. Parasitic on larva of "*Argynnis cybele*."
- A. cardicola* Pack. Parasite on the species of "*Pyrameis*."
- A. flavicornis* Riley. Parasitic on "*Nisoniades juvenalis*."
- A. gillettei* Baker. Parasitic on "*Cacœcia argyrospila*."
- A. glomeratus* Linn. Common throughout the State and parasitic on a great variety of caterpillars, including those of the cabbage butterflies.
- A. theclæ* Riley. Parasitic on larva of "*Thecla*" sp.
- A. hyphantriæ* Riley. Parasitic on the fall web-worm.
- A. junoniæ* Riley. Parasite on the larva of "*Junonia cœnia*."
- A. militaris* Walsh. Parasite on the army worm.
- A. orgyæ* Ashm. Reared from the larva of the Tussock moth.
- A. cassianus* Riley. A parasite of "*Terias nicippe*."
- A. crambi* Weed. Reared from larva of "*Crambus exsiccatu*s."
- A. cyanidiris* Riley. Reared from "*Lycæna pseudargiolus*."
- A. ephestiæ* Baker. A parasite of the Mediterranean flour moth.
- A. palæacritæ* Riley. Parasitic on the spring canker worm.
- A. politus* Riley. A parasite of "*Scolecocampa liburna*."
- A. sarrothripæ* Weed. Parasite on "*Nycteola revayana*."
- A. empretiæ* Ashm. New Jersey, bred from larva of "*Empretia stimulea*"; a mss. name.
- A. congregatus* Say. Throughout the State; one of the commonest parasites on Sphingid caterpillars. The variety "*hemileuca*" Riley was reared from Saturniids, and the variety "*rufocoxalis*" Riley from the army worm.
- A. atalantæ* Pack. Taken at Philadelphia and parasitic on "*Pyrameis atalanta*" and "*Vanessa milberti*."
- A. crassicornis* Prov. (*Urogaster*) Riverton IX, 5 (Jn).
- A. forbesii* Vier. (*Urogaster*) Riverton V, 30 (Jn).
- A. ensiger* Say. (*Urogaster carpatus* Say.) Atco VI, 13 (Jn); a common parasite on many kinds of caterpillars from "*Papilio*" to "*Tinea*."
- A. hartii* Vier. (*Urogaster*) Philadelphia VIII, 28 (Jn); a parasite of "*Pyrausta nelumbialis*."

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A. cacœcia Riley. (**Urogaster**) Parasitic on "*Cacœcia semiferana*."

The species "*Pseudapanteles consimilis*" Ashm., "*terminalis*" Ashm., "*gallædiplopi*" Ashm. have not been sanctioned by description.

SPHÆROPYX III.

S. bicolor Cress. New Brunswick IX, 17 (Coll).

PHANEROTOMA Wlsm.

P. tibialis Hald. New Brunswick V (Coll). Parasitic on "*Grapholitha caryana*."

MIRAX Halid.

M. aspidiscæ Ashm. Parasitic on "*Aspidisca splendoriferella*."

M. grapholithæ Ashm. Parasitic on "*Grapholitha prunivora*."

M. lithocolletidis Ashm. A parasite of "*Lithocolletis ornatella*."

SIGALPHUS Latr.

S. tibiator Cress. Type locality in New Jersey.

S. curculionis Fitch. A parasite of the plum curculio.

S. rufiscapus Prov. Shark River VII, 12 (Jn).

S. virginiensis Ashm. Egg Harbor VI, bred from strawberry weevil.

UROSIGALPHUS Ashm.

U. robustus Ashm. Lakehurst VII 7 (Coll).

CHELONUS Jur.

C. biannularis Ashm. Cape May VI, 22 (Jn); a mss. name.

C. basilaris Say. Pennsylvania and probably New Jersey (Ashm).

C. electus Cress. Atlantic City VII (Jn).

C. lunatus Hald. New Jersey probably (Ashm).

C. basicinctus Prov. Clementon V, 30 (Jn).

C. sericeus Say. New Jersey, not common (Bt).

C. sobrinus Hald. Pennsylvania and probably New Jersey (Ashm).

C. lavernæ Ashm. Parasite on "*Laverna eloisella*."

C. parvus Say. A parasite on "*Cecidomyia strobiloides*."

C. fissus Prov. New Brunswick VII, 20, Jamesburg V, 31, Lakehurst VII, 7, Anglesea VII, 12 (Coll).

ASCOGASTER Wlsm.

A. pallidicornis Ashm. Newark VI, 16, Jamesburg (Sm); a mss. name.

A. provancheri D. T. (*rubripes* Prov.) New Brunswick V, 20, Jamesburg (Sm).

RHOGAS Nees.

- R. abdominalis** Cress. New Jersey (Cress).
R. aciculatus Cress. New Jersey (Cress Coll).
R. burrus Cress. A parasite on larvæ of "Acronycta" sp.
R. intermedius Cress. Westville IV, 19 (Jn); Ocean Co. V (Sm); reared from various species of "Acronycta."
R. lectus Cress. New Jersey (Cress).
R. terminalis Cress. Boonton (GG); Caldwell (Cr); Riverton VII, 3 (Jn); parasitic on the army worm and on "Nephelodes violans."
R. parasiticus Nort. Ocean Co. (Sm); parasite on "Lophyrus abietis."
R. rileyi Cress. Clementon V, 30 (Jn); parasitic on "Acronycta oblinita" and "Nephelodes violans."
R. stigmator Say. Merchantville III, 13 (Jn).
R. canadensis Cress. Reared from "Ichthyura inclusa."
R. harrisinae Ashm. Parasitic on "Harrisina americana."
R. melleus Cress. Parasitic on "Ichthyura," "Aplodes," "Eucrostis," etc.
R. nolophanæ Ashm. Reared from "Nolophana malana."
R. platypterygus Ashm. Parasitic on "Platypteryx arcuata."
R. discoideus Cress. (*Pelecystoma*) New Brunswick VII, 20 (Sm).

HETEROGAMUS Wlsm.

- H. fumipennis** Cress. Parasitic on "Sphinx" and "Cressonia" larvæ.

HECABOLUS Curt.

- H. lycti** Cress. Pennsylvania (Cress) and probably New Jersey (Ashm).
H. minimus Cress. Pennsylvania (Cress) and probably New Jersey (Ashm).
H. utilis Cress. New York (Cress) and probably New Jersey (Ashm).

CLINOCENTRUS Halid.

- C. mellipes** Ashm. New Jersey probably (Ashm).

CHREMYLUS Halid.

- C. terminalis** Ashm. Widely distributed and sure to occur in New Jersey.

CALLIHORMIUS Ashm.

- C. stigmatus** Ashm. Camden VIII, 26 (Jn); a mss. name.

DORYCTES Halid.

- D. pallipes** Prov. Pennsylvania and probably New Jersey (Ashm).
D. exhalans Say. Jamesburg VII, 15 (Sm).

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ODONTOBRACON Cam.

- O. bicolor* Ashm. Camden VI, 30 (Jn); a mss. name.

ECPHYLUS Först.

- E. pallidus* Ashm. Parasitic in larva feeding on red-bud (Ashm).
E. hypothernemi Ashm. Bred from "Hypothernemus" sp.

SACTOPUS Ashm.

- S. schwarzii* Ashm. Anglesea VII, 24 (Sz); a mss. name.

CÆNOPHANES Först.

- C. anthaxiæ* Ashm. Reared from larva of "Anthaxia viridicornis."
C. hylotrupides Ashm. Parasitic on "Hylotrupes ligneus."
C. languriæ Ashm. Parasitic on "Languria."
C. pityophthori Ashm. A parasite of "Pityophthorus."

LYSITERMUS Först.

- L. scolyticida* Ashm. A parasite of "Scolytus 4-spinosus."

SPATHIUS Nees.

- S. honestor* Say. Lahaway IV, 1 (Coll, Ashm).
S. simillimus Ashm. Widely distributed (Ashm); parasitic on "Agrilus bilineatus."
S. canadensis Ashm. Widely distributed through the U. S. (Ashm); parasitic on various bark beetles.
S. claripennis Ashm. Reared from "Polygraphus rufipennis."
S. pallidus Ashm. Parasite on "Callidium variabilis."
S. unifasciatus Ashm. Bred from "Scolytus 4-spinosus."

RHYSSALUS Halid.

- R. atriceps* Ashm. Parasitic on "Cacœcia rosaceana."
R. loxotæniæ Ashm. Parasitic on "Loxotænia clemensiana."
R. selandriæ Ashm. Reared from "Eriocampa cerasi."
R. trilineatus Ashm. Parasitic on "Coleophora caryæfoliella."

BRACON Fab.

- B. apicatus* Prov. Near Philadelphia V, 17 (Jn); and probably New Jersey (Ashm).
B. scrutator Say. Common in New York and Pennsylvania and probably in New Jersey (Ashm).
B. euraæ Ashm. Atlantic Co. V, parasitic on raspberry saw fly (Sm).
B. nigropectus Prov. Ocean Co. V (Sm).

- B. dorsator* Say. Trenton V, 20 (Hk).
B. catochæ Ashm. Atlantic Co., a parasite in "*Adirus (Cephus) trimaculatus*" (Coll).
B. mellitor Say. (*xanthostigmus* Cress.) New Brunswick VII, 21 (Sm); Westville VI, 6, Clementon V, 30, VI, 6 (Jn).
B. cookii Ashm. Ocean Co. V (Sm).
B. pygmæus Prov. Jamesburg VII, 15 (Sm).
B. bucculatrix Ashm. Bred from "*Bucculatrix*" sp.
B. pomifoliellæ Ashm. Parasitic on "*Bucculatrix pomifoliella*."
R. rhyssemati Ashm. A parasite of "*Rhyssematus lineaticollis*."
B. gastroideæ Ashm. Bred from "*Gastroidea cyanea*."
B. trifolii Ashm. Bred from a tortricid in flower heads of white clover.
B. rugator Say. (*Glyptomorpha*) Westville VI, 6, Clementon VIII, 11 (Jn); Anglesea IX, 8 (Dke).
B. charus Riley. (*Melanobracon*) Parasite on the flat-head apple-borer.
B. pectorator Say. (*Melanobracon*) Parasitic on "*Saperda vestita*," "*Melanophila fulvoguttata*" and "*Chrysobothris femorata*."
B. rugosiventris Ashm. Dover VII, 16 (Jn).
B. simplex Cress. Clementon VIII, 11, Avalon VI, 30 (Jn).
B. gelechiæ Ashm. (*Habrobracon*) Parasite on "*Gelechia cinerella*."
B. hebetor Say. Cramer Hill V, 21 (Jn).
B. pissodis Ashm. (*Cœliodis*) Parasite of the white pine weevil.

MACRODYCTIUM Ashm.

- M. flaviventris* Ashm. Ocean Grove V (Sm); a mss. name.

IPHIAULAX Först.

- I. agrili* Ashm. Parasite on "*Agrilus fulgens*" and "*Neoclytus erythrocephalus*."
I. erythrogaster Brullé. Bred from "*Cyllene picta*."

VIPIO Latr.

- V. schwarzi* Ashm. New York to Georgia, and probably New Jersey (Ashm).

Family ALYSIDÆ.

CÆLINIUS Nees.

- C. meromyzæ* Forbes. Parasitic on "*Meromyza americana*."

DACNUSA Halid.

- D. smithii* Ashm. Ocean Grove V (Sm); a mss. name.

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TANYSTROPHA Först.

T. americana Ashm. Ocean Grove V (Sm); a mss. name.

MESOCRINA Först.

M. microrhopalæ Ashm. Bred from "*Microrhopala xerene*."

M. pegomyiæ Brues. A parasite on the common cabbage maggot.

APHÆRETE Först.

A. muscæ Ashm. New Brunswick VII, 20 (Sm); a parasite of the "horn-fly" and other Diptera.

A. auripes Prov. New Jersey, probably (Ashm).

A. pallipes Say. New Brunswick (Sm).

A. pegomyiæ Brues. A parasite of the common cabbage maggot.

A. oscinidis Ashm. Bred from "*Oscinis*" sp., mining leaves of "*Plantago major*."

ALYSIA Latr.

A. ridibunda Say. (*Cratospila rubicunda*) Westville VI-VIII (div); Woodbury V, 27 (Jn); and probably throughout the State (Vk).

GRAMMOSPILA Först.

G. triticaphis Fitch. New Jersey, bred from a wheat louse (Sm).

Family CAPITONIIDÆ.

CAPITONIUS Brullé.

C. ashmeadii D. T. (*Cenocœlius rubriceps* Ratz.) Camden VI, 22 (Jn); Rocky Hill VI (Coll); bred from "*Sternidius alpha*," living in pith of "*Rhus glabra*."

Family ICHNEUMONIDÆ.

EUSTERINX Först.

E. neglegere Davis. New Jersey (Davis); the type locality.

ATELEUTE Först.

A. elongata Davis. Atlantic City (Sm); the type locality.

PLECTISCUS Grav.

P. pleuralis Cress. A species of general distribution and sure to be found in New Jersey.

ADELOGNATHUS Holm.

A. flavopictus Davis. New Jersey probably (Ashm).

CREMASTUS Grav.

C. cooki Davis. (*Temelucha*) Camden Co. (Vk); Atlantic Co. VII, bred from the strawberry leaf-roller (Sm).

C. retiniæ Cress. (*Temelucha websteri* Ashm.) Staten Island (Ds); Riverton IX, 5, Clementon, Sea Isle VII, 22 (Jn); Anglesea V, 28 (Sm); parasite on "*Retinia rigidana*."

PRISTOMERUS Holm.

P. euryptychiæ Ashm. Del. Water Gap VII, 6 (Jn); bred from "*Eucosma scudderiana*."

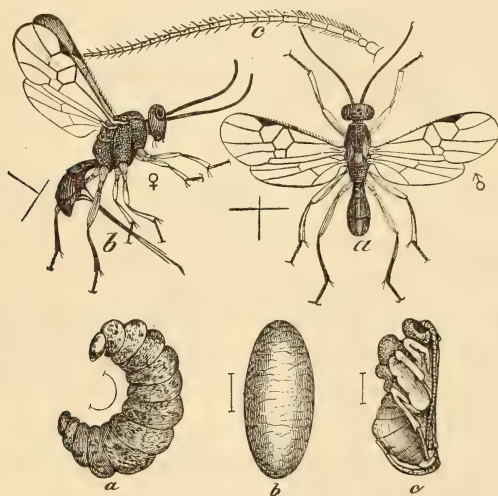
THERSILOCHUS Holm.

Fig. 251.—*Thersilochus conotracheli*, parasite on plum curculio: male and female adults, larva *a*, cocoon *b*; and pupa *c*: all much enlarged.

T. contracheli Riley. New Jersey (Sm); a parasite of the plum curculio.

T. pallipes Prov. (*Porizon*) Long Island and probably New Jersey (Ashm).

LEPTOPYGAS Först.

L. orbis Davis. New Jersey district (Ashm).

PORIZON Grav.

P. facilis Cress. (*Temelucha fascialis*) Widely distributed in the United States, and sure to occur in New Jersey (Ashm).

P. macer Cress. (*Temelucha*) Clementon V, 30 (Jn).

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ORTHOPELMA Tasch.

- O. diastrophii* Ashm. In galls of "*Diastrophus radicum*," Jamesburg (Sm).
O. minutum Ashm. Occurs in galls of "*Rhodites erythrogaster*."

MESOCHORUS Grav.

- M. americanus* Cress. G. d., throughout the United States (Cress).
M. luteipes Cress. New Brunswick (Sm); type locality in New Jersey.
M. melleus Cress. Pennsylvania (Cress), and probably New Jersey.
M. obliquus Cress. A parasite of "*Euchætes egle*."
M. scitulus Cress. New Brunswick, Ocean Co. V, ex larva of "*Smerinthus geminatus*" (Sm); also in "*Colias philodice*" and the army worm.
M. pieridicola Pack. Parasite on the common cabbage butterfly.
M. vitreus Walsh. Bred from the army worm.
M. uniformis Cress. (*Astiphromma*) Philadelphia (Ashm), and probably New Jersey.

AGATHOBRANCHUS Ashm.

- A. æquatus* Say. Riverton VIII, 31, IX, 8 (Jn).

CERATOGASTRA Ashm.

- C. fasciata* Cress. (*Ceratosoma*) Boonton VIII, 14 (GG); Staten Island VIII (Ds); Trenton IX, 2, Clementon VIII, 15 (Hk); Riverton VIII, 17, Mt. Holly VIII, 19, Manumuskin VIII, 17 (Dke).

BRANCHUS Fab.

- B. inermis* Prov. New York and probably New Jersey (Ashm).
B. pallescens Prov. (*Cidaphurus*) Merchantville VI, 4 (Dke).
B. cressonii Vier. Merchantville V, 26, Clementon IV, 5, DaCosta VI, 3 (Dke); Manumuskin IV, 24 (Coll).

EXETASTES Grav.

- E. fascipennis* Nort. Riverton X, 21 (Jn).
E. scutellaris Cress. Chester IX, 16 (Coll); Avon IX, 27 (Hk).
E. suaveolens Walsh. Trenton VIII, 19 (Hk).
E. propinquus Cress. Boonton IX, 11, Great Notch IX, 8 (GG).

PANISCUS Grav.

- P. geminatus* Say. Boonton IX, 5 (GG); Caldwell (Cr); Staten Island V (Ds); Jamesburg VI, 4, Lahaway VII, 3 (Coll); Westville IX, 12 (Jn); Delair X, 5, Riverton IX, 25, Merchantville V, 26, DaCosta VI, 3 (Dke).
P. albotarsus Prov. New York and probably New Jersey (Ashm).
P. albovariegatus Prov. Clementon V, 30 (Hk).
P. texanus Ashm. Westville VI, 7 (Jn).

OPHELTES Holm.

- O. glaucopterus* Linn. Long Island (Ashm) and probably New Jersey.

LIMNERIUM Ashm.

- L. annulipes* Cress. Riverton V, 13 (Jn); parasitic on "Mamestra picta," "Gelechia pseudacaciella" and "Acrobasis indiginella."
- L. distinctum* Cress. New Jersey (Cress); the type locality.
- L. flavirictum* Cress. Lenola V, 30, Sea Isle VII, 22 (Jn).
- L. major* Cress. Pennsylvania, Delaware and probably New Jersey.
- L. lophyri* Riley. Parasitic on "Lophyrus abbottii."
- L. oxylus* Cress. A parasite of the army worm.
- L. tibiator* Cress. New Jersey (Cress), the type locality.
- L. validum* Cress. A species of general distribution in the United States.
- L. vicinum* Cress. Type locality is New Jersey.
- L. acronyctæ* Ashm. Parasitic on "Acronycta oblinita."
- L. dimidiatum* Cress. Parasitic on "Gelechia gallæsolidaginis."
- L. mellipes* Prov. A parasite of "Depressaria fulvipennella."
- L. nephelodis* Ashm. Reared from "Nephelodes violans."
- L. fugitivum* Say. (*Amelectonus*) A common and widely distributed species parasitic on a great variety of Lepidopterous larvæ.
- L. annulipes* Cress. Parasitic on "Mamestra," "Gelechia" and "Acrobasis."
- L. clisiocampæ* Weed. An important parasitic check to the American tent caterpillar "Malacosoma americana."
- L. argentifrons* Cress. (*Rhimphoctona*) Bred from "Crambus zeellus."
- L. provancheri* D. T. (*Meloborus dubitata* Cress.) Cramer Hill V, 21 (Jn); bred from the fall army worm "Laphygma frugiperda."
- L. subrubidum* Cress. (*Meloborus*) New Jersey (Ashm).
- L. obscurum* Cress. (*Meloborus notæ* Ashm.) Long Island to Texas (Ashm).
- L. canarsisæ* Ashm. (*Sinophorus*) Parasite on "Canarsia hammondi."
- L. johnsoni* Ashm. (*Sinophorus*) Atlantic City (Jn); a mss. name.
- L. orgyiæ* How. Bred from the white-marked tussock moth.
- L. bilineatus* Ashm. (*Rythmonotus*) Clementon V, 16 (Jn); a mss. name.
- L. rufipes* Ashm. (*Spudastica*) Riverton V, 1 (Jn); a mss. name.
- L. limenitidis* How. A parasite of "Limenitis archippus."

CAMPOPLEX Grav.

- C. diversus* Nort. Staten Island (Ds).
- C. genuinus* Nort. Bred from "Lophyrus abietis."
- C. villosus* Nort. Clementon IX, 7 (Hk).

HETEROPELMA Wesm.

- H. flavicorne* Brullé. Staten Island (Ds); Newark, from larva of "Sphinx luscitiosa," Jamesburg IX, 4 (Sm).
- H. datanæ* Riley. A parasite on "Datana integerrima," etc.

EXOCHILUM Wesm.

- E. acronyctæ** Ashm. Del. Water Gap VII, 14 (Jn); reared from "*Acronycta*" sp.
- E. fuscipenne** Nort. New Jersey, Ocean Co. (Coll).
- E. mundum** Say. Boonton VII, 10 (GG); Newark, ex larva of "*Zerene catenaria*" (Sm); Staten Island (Ds); Riverton IX, 8 (Jn); Clementon VIII, 27 (Vk); DaCosta VII, 20, Iona VIII, 25 (Dke); also reared from "*Papilio*" and "*Pyrameis*."
- E. nigrovarium** Prov. Great Notch VIII, 21, Manumuskin VIII, 5 (Dke); Westville VI, 22 (Jn).
- E. tenuipes** Nort. A parasite of "*Spilosoma virginica*."

ANOMALON Grav.

- A. anale** Say. Newark, New Brunswick V (Sm); Atco VI, 18, Westville VII, 4 (Jn).
- A. curtum** Nort. Westville IV, 19 (Jn).
- A. laterale** Brullé. Of general distribution, and should occur in New Jersey.
- A. metallicum** Nort. Delaware Water Gap VII, 11 (Jn).
- A. relictum** Fab. United States generally (Cress), and should occur with us.
- A. semirufum** Nort. Westville IV, 19 (Jn).
- A. smithii** Davis. New Brunswick (Sm); the type locality.
- A. pseudargioli** How. Parasitic on some of our common *Lycænids*.
- A. pædiscæ** Ashm. (*Agrypon*) Parasitic on species of "*Eucosma*."

EIPHOSOMA Cress.

- E. femorata** Cress. Shark River VI, 9 (Jn).

NOTOTRACHYS Marsh.

- N. ejuncidus** Say. New York (Ashm) and probably New Jersey.

ENICOSPILUS Steph.

- E. purgatus** Say. Del. Water Gap VII, 12, Chester VIII, 15 (Coll); Staten Island (Ds); Lucaston IX, 29, DaCosta VII, 19, Brown's Mills V, 30 (Dke); Lahaway VII, VIII, Anglesea V, 30 (Sm); a parasite on "*Mamestra trifolii*," "*M. picta*," "*Leucania unipuncta*" and "*Cœlodasys unicornis*."

EREMOTYLUS Först.

- E. arctiæ** Ashm. Long Island, Pennsylvania and probably New Jersey (Ashm).



Fig. 252.—*Enicospilus purgatus*.

THYREODON Brullé.

- T. morio** Fab. Del. Water Gap VII, 12 (Jn); Boonton VIII, 8 (GG); Great Notch VIII, 21, Weymouth VIII, 16, Manumuskin IX, 5 (Dke); Newark, Jamesburg VIII, 11, Ocean Grove VI, 1 (Coll); Avalon VII, 19 (CG).

OPHION Fab.

- O. bifoveolatum** Brullé. New Brunswick (Coll).
O. bilineatus Say. Chester VII, 20, New Brunswick V, 15 (Coll); Staten Island (Ds); Riverton V, 1 (Jn); Lahaway IV, V (Sm); reared from "Eudamus tityrus" and "Feltia morrisoniana."
O. glabratus Say. Of general distribution, parasitic on the fall web worm.
O. geminatus Say. Chester VII, VIII, Essex Co. (Coll).
O. macrurum Linn. Throughout the State, common; parasitic on the larger silk-worms (Sm).
O. tityri Pack. New Brunswick (Sm); parasite of "Eudamus tityrus."

EXOCHUS Grav.

- E. dorsalis** Cress. New Jersey (Cress); the type locality.
E. pallipes Cress. Reared from "Archips rileyana," "Cacœcia fervidana" and "C. cerasivorana."

METACÆLUS Först.

- M. lævis** Cress. New Brunswick VII, 17 (Sm).

Fig. 253.—*Ophion macrurum*.**TRICHISTUS** Först.

- T. curvator** Fab. New Brunswick (Sm); reared from "Archips rileyana" and "Nothris verbascella."
T. pygmæus Cress. Trenton IX, 7 (Hk).

CHORINÆUS Holm.

- C. carinatus** Cress. New Jersey probably (Ashm).

ALCOCERAS Först.

- A. trifasciatus** Cress. United States generally (Cress), and sure to be found in New Jersey.

SYRPHOCTONUS Först.

- S. agilis** Cress. New Jersey (Davis).

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PROMETHUS Först.

P. costalis Prov. New York and probably New Jersey (Ashm).

BASSUS Grav.

B. lætatorius Fab. New Jersey, common (Ashm); Riverton V, 7 (Jn); Atlantic City VII, 21 (Dke).

B. scutellaris Cress. A parasite of the army worm.

MESOLEIUS Holm.

M. submarginatus Cress. New York (Davis) and probably New Jersey.

M. mellipes Prov. New York (Davis) and probably New Jersey.

BCÆTHUS Först.

B. schizoceri Riley & How. A parasite on the sweet potato saw-fly, "Schizocera ebenus" (Ashm).

SPHECOPHAGA Westw.

S. burra Cress. (*Cacotropa*) New York (Zabriskie) and probably New Jersey.

DIALGES Först.

D. frontalis Davis. New Jersey probably (Davis); the variety "rivalis" Davis has been taken at Philadelphia (Jn).

TRYPHON Grav.

T. communis Cress. New Jersey (Davis); the var. "clypeatus" Prov. has also been taken in the State.

T. seminiger Cress. Lenola VI, 4, Clementon V, 22 (Jn).

QUADRIGANA Davis.

Q. americana Cress. New Jersey (Davis).

COSMOCONUS Först.

C. canadensis Prov. New York and probably New Jersey (Ashm).

SYNÆCETES Först.

S. sedulus Cress. New Jersey (Davis).

S. propinquus Cress. Clementon V, 10 (Jn).

S. festivus Cress. (*Tryphon*) Clementon V, 10 (Jn).

SCORPIORUS Först.

S. subcrassus Cress. Pennsylvania and probably New Jersey (Davis).

S. analis Cress. Pennsylvania and probably New Jersey (Davis).

POLYBLASTUS Hartig.

- P. pedalis** Cress. New York and probably New Jersey (Ashm).
P. tibialis Cress. New York and probably New Jersey (Ashm).

MONOBLASTUS Hartig.

- M. varifrons** Cress. Westville VI, 6 (Jn).

ERROMENUS Holm.

- E. crassus** Cress. Recorded from New Jersey (Ashm).
E. dimidiatus Cress. Recorded from New Jersey (Ashm).

EUCEROS Grav.

- E. canadensis** Cress. New York and probably New Jersey (Davis).
E. medialis Cress. New York, Philadelphia, and surely New Jersey (Sm).
E. flavescens Cress. Pennsylvania and probably New Jersey (Ashm).

SCOLOBATES Grav.

- S. auriculatus** Fab. (**crassitarsus** Grav.) New York and probably New Jersey (Ashm).

ECZETESIS Först.

- E. paniscoides** Ashm. New York (Ashm); Pennsylvania (Jn), and surely New Jersey (Sm).

SYMPHERTA Först.

- S. unicolor** Cress. Pennsylvania, Delaware (Davis) and probably New Jersey.

CTENOPELMA Holm.

- C. sanguinea** Prov. New Jersey (Davis).
C. terminalis Ashm. Atco VI, 13 (Jn).

RHORUS Först.

- R. bicolor** Cress. New York, Pennsylvania (Davis) and surely New Jersey.

EXYSTON Schiödte.

- E. clavatus** Cress. New Jersey (Ashm).
E. variatus Prov. New Jersey (Ashm).

ANECPHYSIS Först.

- A. curvineura** Davis. New York (Davis) and probably New Jersey.

EXENTERUS Hartig. (CTENISCUS Hal.)

- E. flavicoxæ** Cress. Canada to Delaware (Cress).
E. orbitalis Cress. Canada to Pennsylvania (Cress).

ZEMIODES Först.

- Z. flavifrons** Cress. New Jersey (Davis), the type locality.

SYMPHOBUS Först.

- S. pleuralis** Cress. New Jersey (Davis), the type locality.

OXYTORUS Först.

- O. antennatus** Cress. Occurs in the New Jersey district.

ALEXETER Först.

- A. honestus** Cress. New Jersey (Davis).
A. canaliculatus Prov. Philadelphia (Jn) and sure to occur in New Jersey.

HADRODACTYLUS Först.

- H. inceptus** Cress. Clementon VIII, 11 (Jn). See "Mesoleptus."
H. elongatus Cress. Delaware (Davis) and probably New Jersey.

MESOLEPTUS Grav.

- M. inceptus** Cress. Clementon VIII, 11 (Jn). See "Hadrodactylus."

CATOGLYPTUS Holm.

- C. furcatus** Cress. G. d. in the United States (Cress).

NOTOPYGUS Holm.

- N. cultus** Cress. New Jersey (Davis), the type locality.

HOMASPIS Först.

- H. albipes** Davis. New York (Davis) and probably New Jersey.

POLYCINETIS Först.

- P. limata** Cress. New York, Delaware (Davis) and probably New Jersey.

SPANOTECNUS Först.

- S. discolor** Cress. Delaware (Davis) and probably New Jersey.
S. concolor Cress. New Jersey (Davis).

XORIDES Grav.

- X. vittifrons* Cress. Reared from "*Dicerca divaricata*," "*Tremex columba*," etc.
- X. caryæ* Harrgt. Reared from "*Saperda discoidea*" or "*Dorcaschema nigrum*."

XYLONOMUS Grav.

- X. stigmapterus* Say. New Jersey (U S N M).

CALLICLISIS Först.

- C. americanus* Cress. G. d. in the United States (Cress).

ODONTOMERUS Grav.

- O. bicolor* Cress. Westville VI, 6 (Jn).
- O. mellipes* Say. New Jersey (Cress); Trenton V, 31, Wenonah V, 15 (Hk).

POLYSPHINCTA Grav.

- P. limata* Cress. Recorded from New Jersey (Ashm).
- P. nigrita* Walsh. Staten Island III (Ds).
- P. dictynæ* Riley. Bred from the spider "*Dictyna volupis*."

GLYPTA Grav.

- G. animosa* Cress. Reared from "*Pædisca scudderiana*" (Vk).
- G. erratica* Cress. G. d. in the United States (Cress); parasitic on "*Grapta comma*" (Vk).
- G. militaris* Cress. Reared from "*Proteoteras æsculana*."
- G. rufiscutellaris* Cress. New Brunswick VII, 20 (Sm); bred from "*Proteoteras æsculana*" (Vk).
- G. simplicipes* Cress. Middlesex Co. VI, VII (Sm); parasitic on a variety of Tortricid species.
- G. vulgaris* Cress. Type locality, New Jersey (Cress); Boonton VIII, 3 (GG); breeds in "*Botis inæqualis*" and "*Margarodes 4-stigmalis*."
- G. varipes* Cress. Riverton IV, 17 (Jn).
- G. monita* Cress. Reared from "*Gelechia juncidella*."
- G. phoxopteridis* Weed. Reared from "*Phoxopteris comptana*."
- G. scitula* Cress. (*Ctenochira*) New Jersey (Cress).
- G. leucozonata* Ashm. Philadelphia (Jn) and sure to occur in New Jersey. Parasitic on "*Grapholita interstictana*."

PANTELES Först.

- P. mellithorax* Ashm. Clementon VI, 30 (Jn); a mss. name.

PIMPLA Fab.

- P. marginata* Prov. (*annulipes* Auct., not Brullé). Throughout the State; parasitic on a great variety of caterpillars from "*Papilio ajax*" to "*Carpocapsa pomonella*."

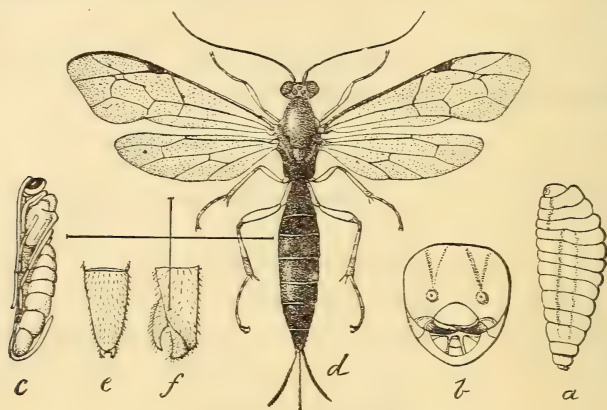


Fig. 254.—*Pimpla conquisitor*: *a*, larva; *c*, pupa; *d*, adult female; all enlarged; other letters refer to structural details.

- P. conquisitor* Say. Throughout the State; one of the commonest parasites in caterpillars.
- P. grapholithæ* Cress. Reared from "*Grapholitha caryana*."
- P. indagatrix* Walsh. G. d. in the United States (Cress); bred from "*Tortrix incertana*," "*Acrobasis juglandis*," "*Coleophora cinderella*."
- P. inquisitoriella* D. T. (*inquisitor* Say.) Throughout the State; a common parasite on a great variety of lepidopterous larvæ.
- P. notanda* Cress. Riverton V, 1 (Jn); New Jersey (Cress Coll); parasitic on "*Lepidoptera*" generally, but not common.
- P. pedalis* Cress. Caldwell (Cr); Staten Island IX (Ds); New Brunswick (Sm).
- P. picticornis* Cress. New Jersey is the type locality.
- P. rufovariegata* Cress. (*rufovariata*) New Jersey (Cress).
- P. scriptifrons* Cress. G. d. in the United States (Cress) and is parasitic on the common spider "*Epeira riparia*."
- P. tenuicornis* Cress. Anglesea V, 28, parasitic on "*Sesia caudata*" (Sm).
- P. pterelas* Say. New Jersey (Cress Coll); parasitic on "*Pædisca scudermana*" and "*Gelechia gallæsolidaginis*."

THERONIA Holmg.

- T. melanocephala* Brullé. Palisades VIII, 11 (Dke); New Jersey (Ashm).
- T. fulvescens* Cress. Little Falls V (Ds); Lahaway X, 13 (Coll); a parasite on "*Pimpla conquisitor*."

PERITHOUS Holmg.

P. pleuralis Cress. Nyack, N. Y. (Zabriskie), and sure to occur in North Jersey.

CALLIEPHIALTES Ashm.

C. xanthothorax Ashm. Parasitic on "Euura nodus."

EPHIALTES Grav.

E. albipes Cress. Recorded from New Jersey (Ashm).

E. comstocki Cress. Reared from "Retinia comstockiana."

E. irritator Fab. Trenton IV, 24, Wenonah V, 16 (Hk); Clementon V, 10 (Jn); Manumuskine X, 8-21 (Dke); reared from "Liopus variegatus."

E. mesocentrus Grav. (rex Kriech). A European parasite of "Coccyx resinana" introduced into New York State (Ashm), and which probably occurs in New Jersey as well.

E. tuberculatus Fourc. Probably introduced from Europe, where it is parasitic on a variety of wood-boring coleopterous larvæ, one of which, "Cryptorhynchus lapathi," also occurs in New Jersey. Also infests lepidopterous larvæ.

MEGARHYSSA Ashm. (THALESSA Holm.)

M. atrata Fab. Common throughout the State (Sm).

M. nitida Cress. Has been taken on the Palisades, near Fort Lee.

M. nortoni Cress. Rare at Caldwell (Cr).

M. greeni Vier. Type locality, Boonton (Vk).

M. magnifica Vier. Merchantville V, 26 (Dke).

M. lunator Fab. Throughout the State, hardly less common than "atrata." Parasitic on "Tremex columba" These species are the common, long-tailed "Ichneumons," often found with their bristle-like ovipositors inserted into trees; hence generally suspected of being wood-borers.

RHYSSA Grav.

R. persuasoria Linn. This, with its variety "albomaculata" Cress., no doubt occurs throughout the State. It has been reared from "Monohammus scutellator" and "confusor," and in Europe is parasitic on species of "Sirex."

MENISCUS Schiödde.

M. johnsoni Davis. Jamesburg (Jn); type locality in New Jersey.

M. scutellaris Cress. (Bathycetes) Del. Water Gap VII, 8 (Jn); bred from "Gelechia pseudacaciella."

M. mirabilis Cress. (Asphragis) New Jersey district.

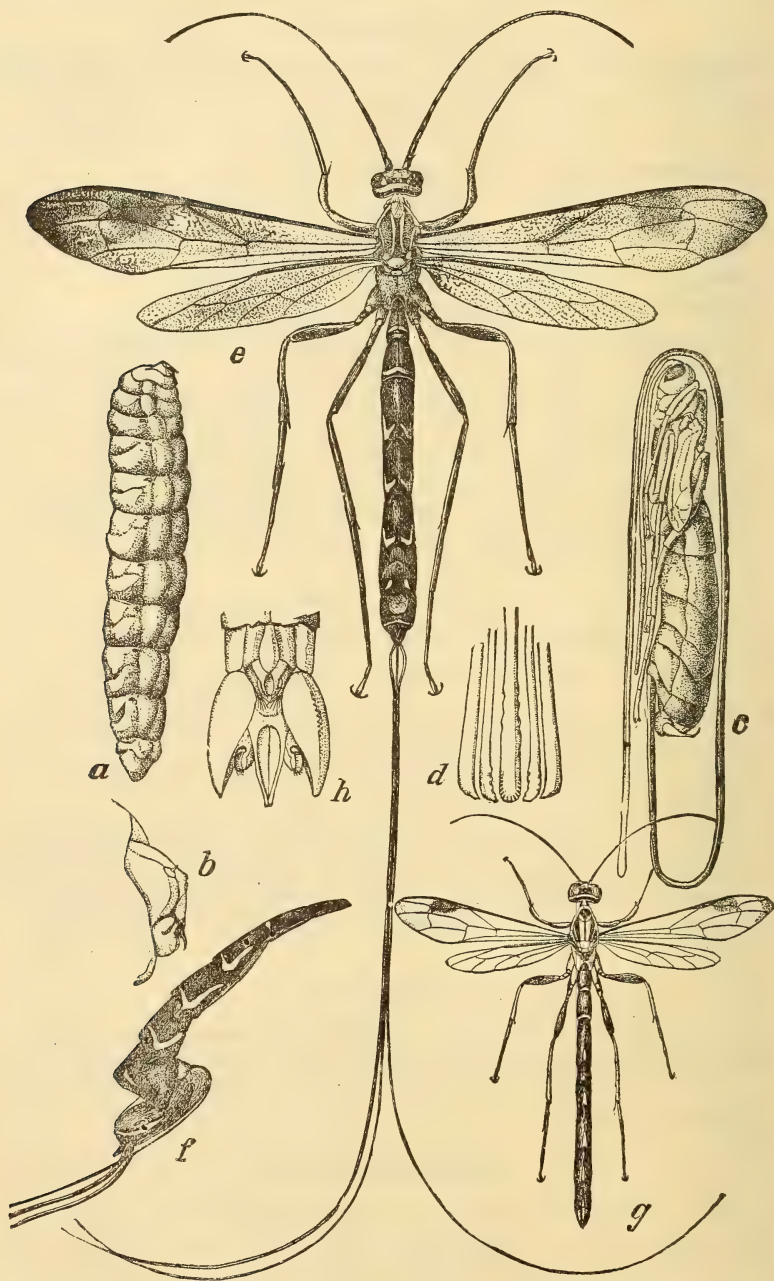


Fig. 255.—Long-tailed ichneumon, *Megarhyssa lunator*: a, larva; b, head of same enlarged; c, pupa; d, tip of pupal ovipositor enlarged; e, female adult; f, tip of her abdomen from side; g, male adult; h, tip of abdomen enlarged.

LISSONOTA Grav.

- L. acrobasis* Ashm. Reared from "Mineola indiginella."

PHYTODIETUS Grav.

- P. distinctus* Cress. G. d. in the United States and Canada (Cress).
P. vulgaris Cress. Ocean County V (Sm).

ARENETRA Holmg.

- A. nigrita* Walsh. G. d. in the United States and Canada (Cress).

LAMPRONOTA Halid.

- L. agilis* Cress. New York, Pennsylvania and probably New Jersey.
L. rubrica Cress. (Lissonota) New Jersey (Cress); Trenton IV, 24 (Hk).
L. tegularis Cress. (Alloplasta) New Jersey district.
L. varia Cress. (Alloplasta) Sure to occur in New Jersey.
L. insita Cress. New Jersey (Cress).
L. pleuralis Cress. Parasitic on "Tortrix incertana."
L. parva Cress. (Bathycetes) New Jersey probably.
L. pulchella Cress. (Alloplasta) New Jersey (Cress), the type locality.
L. occidentalis Cress. Jamaica, L. I., VI (Coll), and should be found in New Jersey.
L. relativa Vier. New Jersey (Cress Coll).

GROTEA Cress.

- G. anguina* Cress. Woodbury VI, 27 (Jn); Ocean Grove VII (Ashm); type locality in New Jersey; reared from "Ceratina dupla," of which it is a parasite (Vk)

LABENA Cress.

- L. grallator* Say. New Brunswick (Coll), Brown's Mills VII, 10 (Hk); DaCosta VII, 20, Manumuskin (Dke).
L. apicalis Cress. New Brunswick (Sm); reared from "Chrysobothris femorata."

AROTES Grav.

- A. amoenus* Cress. New Hope VII, 10 (Hk).
A. decorus Say. Boonton VIII, 12 (GG).
A. venustus Cress. Delaware Water Gap VII, 12 (Jn).
A. vicinus Cress. Delaware Water Gap VII, 12 (Jn).

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COLEOCENTRUS Grav.

C. rufus Prov. Pennsylvania and probably New Jersey.

MESOSTENUS Grav.

- M. arvalis* Cress. Parasitic in nest of "Polistes."
M. americana Cress. Maine to Virginia (Cress).
M. gracilis Cress. Sea Isle City VII, 22 (Jn); parasitic on "Dakruma coccidivora" and "Ephestia kuehniella."
M. spinarius Brullé. Trenton VIII, 12, Clementon VIII, 30 (Hk).
M. thoracicus Cress. Atco VI, 4 (Jn).
M. delawarensis D. T. (*albopictus* Cress.) Trenton VII, 11, Pemberton VIII, 12 (Hk); Riverton VIII, 4, Westville VII, 21, Atco VI, 18 (Jn).
M. albomaculatus Cress. Westville VI, 6 (Jn); Ocean Grove VIII (Ashm).

CRYPTUS Fab.

- C. alacris* Cress. Canada to Delaware (Cress).
C. contiguus Cress. Canada to Maryland (Cress).
C. punicus Cress. Glassboro IX, 19 (Jn).
C. subclavatus Say. G. d. in the United States (Cress).
C. retentor Brullé. Staten Island IX (Ds); Philadelphia (Ashm).
C. limatus Cress. Clementon V, 30 (Hk).
C. mundus Prov. Parasitic on "Crambus vulvivagellus."
C. nigripennis Ashm. Type locality in New Jersey (Vk).
C. nuncius Say. (*Spilocryptus*) Newark V, 30, Jamesburg on "Botis feudalís" (Sm); also parasitic on the large "Saturniids," "cecropia, promothea," etc.
C. extrematis Cress. (*Spilocryptus*) Jamesburg (Sm); Lucaston IX, 9 (Hk).
C. latus D. T. (*S. incertus* Cress.) Long Island (Ashm) and probably New Jersey.
C. persimilis Cress. (*Itamoplex*) Avalon VI, 30, Sea Isle VII, 22 (Jn).
C. americanus Cress. (*Itamoplex*) Great Notch VII, 10 (Dke); New Brunswick (Sm); Clementon VIII, 11 (Jn); Lucaston IX, 9 (Hk).
C. lavogleri D. T. (*Itamoplex nigricornis* Prov.) Clementon V, 30 (Hk).
C. linearis Prov. (*Idiolispa leniatus* Cress.) Clementon V, 16 (Jn). It is probable that Ashmead intended this by his record in last edition.
C. similis Cress. (*Idiolispa*:=*Trychosis montivagus* Prov.) New York to Delaware (Ashm).

ACRORICNUS Ratz.

- A. junceus* Cress. (*Osprynchotus*) Reared from a nest of "Odynerus tigris," taken, I think, in this State by Mr. V. A. E. Daecke.

PEZOMACHUS Grav.

- P. dimidiatus* Cress. New York (Ashm) and probably New Jersey.
P. meabilis Cress. Staten Island (Ds).
P. obscurus Cress. Type locality in New Jersey (Cress).
P. uniformis D. T. (*unicolor* Cress.) Massachusetts to Delaware (Cress) and surely New Jersey.
P. tantillus Cress. Riverton V, 17 (Jn).
P. insolitus How. A parasite of the white-marked tussock moth.
P. minimus Walsh. Parasitic on the army worm.

APTESIS Först.

- A. micropterus* Say. A parasite of the currant worm.

HEMITELES Grav.

- H. tenellus* Say. Long Island (Ashm) and probably New Jersey.
H. utilis Norton. Jamesburg, parasitic on "*Anisota senatoria*" (Sm); also on "*Papilio cresphontes*" and "*Lophyrus abietis*."
H. laticinctus Ashm. Parasitic on the army worm.
H. lycænæ How. A parasite on "*Lycæna pseudargiolus*."
H. nemativorus Walsh. A parasite of the currant worm.
H. thyridopterigis Riley. (*Syneches*) Throughout the State, a parasite of the common bag-worm.
H. columbiæ Vier. Reared from "*Pimpla inquisitoriella*"; n. n. for "*americana*" How., not Ashm.
H. meteori How. (*Bathythrix*) Reared from "*Meteorus communis*."
H. pimplæ How. Another hyperparasite on "*P. inquisitoriella*."
H. orgyiæ Ashm. Reared from the common tussock moth.



Fig. 256.—Bag worm parasite, *Hemiteles thyridopterigis*: a, male; b, female; c, cut through bag to show the cocoons of the parasite: all enlarged.

ÆNOPLEX Först.

- Æ. betulæcola* Ashm. (*Acnoplax*) Jamesburg (Sm); bred from "*Acronycta betulæ*."

ACROLYTA Först.

- A. aletiae* Ashm. (*Isodromas*) Parasitic on "*Apanteles aletiae*."
A. empretiae Ashm. A parasite on the saddle-back caterpillar.
A. mesochori Ashm. Reared from "*Apanteles congregatus*."
A. smerinthi Ashm. Bred from caterpillar of "*Smerinthus geminatus*" at New Brunswick (Sm); a mss. name.

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PHYGADEUON Grav.

- P. vulgaris* Cress. Long Island (Ashm) and probably New Jersey.
P. subfuscus Cress. With the preceding.
P. fulvescens Cress. (*Plesiognathus flavescens* Cress.) New Jersey (Jn).

APSILOPS Först.

- A. hirtifrons* Ashm. Reared from "Hydrocampa oblitalis."

STILPNUS Grav.

- S. americanus* Cress. Great Notch VIII, 10 (Dke); Staten Island IX (Ds).
S. compressus Cress. (*Asyncrita*) New York (Ashm) and probably New Jersey.

SELEUCUS Holm.

- S. rufiventris* Ashm. New York (Ashm) and probably New Jersey.

PHÆOGENES Wesm.

- P. fungor* Nort. Long Island, Philadelphia (Ashm); parasite on "Lophyrus abietis."
P. hebe Cress. Long Island (Ashm) and probably New Jersey.
P. alter Cress. Parasitic on peach borer and currant stem borer.
P. gelechiæ Ashm. Reared from "Gelechia gallæsolidaginis."
P. hebrus Cress. (*Herpestomus*) New York (Ashm) and probably New Jersey.

CENTETERUS Wesm.

- C. tuberculifrons* Prov. Long Island (Ashm) and probably New Jersey.

COLPOGNATHUS Wesm.

- C. helvus* Cress. Long Island (Ashm) and probably New Jersey.

NEOTYPUS Först.

- N. lapidator* Fab. Trenton VIII, 3 (Hk).

PLATYLABUS Wesm.

- P. thoracicus* Cress. G. d. in the United States and Canada.
P. foxi Davis. Camden County (Davis), the type locality.

ICHNEUMON Linn.

- I. bimembris* Prov. Long Island (Ashm) and probably New Jersey.
I. brevicinctor Say. Trenton V, 21, VIII, 22 (Hk).
I. blandi Cress. Trenton VIII, 12 (Hk).
I. bronteus Cress. With the preceding.
I. caliginosus Cress. A parasite of "Limnitis archippus."

- l. cœruleus* Cress. Newark, New Brunswick, Lahaway VIII, X (Sm).
- l. centrator* Say. Boonton II, 27 (GG); Staten Island XI (Ds); New Brunswick, bred from "*Pyrrharetia isabella*" (Sm).
- l. cincticornis* Cress. Staten Island IV (Ds); Trenton VIII, 22 (Hk).
- l. citrifrons* Cress. New Jersey, without definite locality (Sm).
- l. comes* Cress. Trenton VII, 5 (Hk); Westville VI, 6 (Jn).
- l. comptus* Say. Staten Island (Ds); Caldwell (Cr); Westville VI, 6 (Jn).
- l. consignatus* Cress. New Jersey probably.
- l. creperus* Cress. New Jersey district.
- l. devinctor* Say. Staten Island II (Ds).
- l. duplicatus* Say. Pemberton IX, 11 (Hk); New Jersey (Sm).
- l. extrematatis* Cress. Staten Island VI (Ds); Riverton IX, 11 (GG); Trenton V, 13, Clementon V, 30 (Hk).
- l. feralis* Cress. Should occur in New Jersey.
- l. finitimus* Cress. New Jersey district.
- l. flavicornis* Cress. Trenton VI, 13 (Hk); New Jersey (Sm).
- l. flavizonatus* Cress. Should be found in New Jersey.
- l. funestus* Cress. Trenton VIII, 19 (Hk).
- l. fuscifrons* Cress. G. d. in the United States (Cress).
- l. galenus* Cress. Trenton VII, 1, VIII, 19, Riverton IV, 10, Glassboro V, 19 (Hk).
- l. germanus* Cress. Massachusetts to Virginia (Cress).
- l. grandis* Brullé. Clementon V, 10 (CG).
- l. helvipes* Cress. G. d. in the United States (Cress).
- l. insolens* Cress. A generally distributed parasite of "*Vanessa antiopa*."
- l. instabilis* Cress. (*Amblyteles innotabilis* Cress.) New Jersey (Cress Coll); a parasite of the common "*Phyciodes tharos*."
- l. jejunos* Cress (also in *Amblyteles*) Trenton V, 24 (Hk).
- l. jucundus* Brullé. Long Island (Ashm); Germantown (Hk) and doubtless in New Jersey; parasitic on "*Hadena devastatrix*."
- l. lætus* Brullé. Staten Island VII (Ds); Newark, New Brunswick, Lahaway (Coll); Trenton VII, 7, VIII, 19 (Hk); Riverton VII, 12 (GG).
- l. leucaniæ* Fitch. A parasite of the army worm in New York, and sure to be found in New Jersey as well.
- l. leviculus* Cress. Ranges from New York to Virginia (Cress).
- l. lewisii* Cress. Trenton VII, 25 (Hk).
- l. libens* Cress. New Jersey (Cress Coll).
- l. lividulus* Prov. Newark, bred from "*Agrotis c-nigrum*" (Sm).
- l. longulus* Cress. G. d. in the United States (Cress).
- l. manis* Cress. Massachusetts to N. Carolina (Cress).
- l. merus* Cress. Trenton VIII, 5 (Hk).

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1. *malacus* Say. New Brunswick IX, 2, Jamesburg IX (Sm); reared from "Spilosoma virginica" and "Sesia syringæ."
1. *maurus* Cress. Staten Island (Ds); Trenton VI, 27 (Hk).
1. *milvus* Cress. United States generally (Cress).
1. *mimicus* Cress. G. d. in the United States (Cress).
1. *mucronatus* Prov. Canada to Virginia (Cress).
1. *nanus* Cress. New Brunswick VII, from "Acrobasis rubrifasciella" (Sm).
1. *navus* Say. Staten Island IV, V (Ds).
1. *nuncius* Cress. Staten Island IV (Ds).
1. *otiosus* Say. New Jersey (Cress Coll).
1. *paratus* Say. Riverton VI, 13, Glenside VI, 10 (Hk); Philadelphia VI (Fox).
1. *parvus* Cress. United States generally (Cress).
1. *pepticus* Cress. Recorded from New Jersey by Cresson.
1. *pomilius* Prov. G. d. in the United States and Canada (Cress).
1. *pulcher* Brullé. With the preceding (Cress).
1. *purpuripennis* Cress. New Brunswick V, 4 from "Noctua c-nigrum" (Coll).
1. *acerbus* Cress. New Jersey, probably.
1. *agnitus* Cress. New Jersey district.
1. *annulatus* Prov. Clementon V, 22 (Jn).
1. *annulipes* Cress. Sea Isle City VI, 21 (Jn).
1. *apertus* Cress. Probably occurs in New Jersey.
1. *ater* Cress. Found in the New Jersey district.
1. *azotus* Cress. Clementon VIII, 23 (Hk).
1. *pullatus* Cress. Reared from "Spilosoma virginica" and "Nematus ventralis."
1. *residuus* Say. "United States" (Say).
1. *rubicundus* Cress. G. d., a parasite of "Lophyrus abietis."
1. *rufiventris* Brullé. Trenton VII, 15, Malaga IX, 15 (Hk); New Jersey (Cress Coll); reared from "Pyrameis" and "Vanessa."
1. *scriptifrons* Cress. Long Island (Ashm) and probably New Jersey.
1. *scitulus* Cress. G. d. in the United States and Canada (Cress).
1. *sagus* Cress. Long Island (Ashm) and probably New Jersey.
1. *seminiger* Cress. Trenton IX, 7, Riverton IX, 19 (Hk); New Jersey (Cress Coll).
1. *signatipes* Cress. Trenton VIII, 22, Clementon V, X, Anglesea VI, 11 (Hk); bred from "Spilosoma virginica."
1. *soror* Cress. Westville VII, 4 (Jn).
1. *suadus* Cress. Trenton VIII, 19, Clementon V, 30 (Jn).
1. *subcyaneus* Cress. Caldwell (Cr); Trenton V, 16 (Hk).

1. *subdolos* Cress. Staten Island (Ds); Long Island (Ashm).
1. *sublatus* Cress. (*Amblyteles*) Staten Island VIII (Ds); Trenton VIII, 19 (Hk); Clementon V (Jn).
1. *succinctus* Brullé (also as *Amblytelus*). Throughout the State V-IX, common.
1. *solitus* Cress. Camden Co. III (Jn).
1. *unifasciatorius* Say. Caldwell, parasite on "*Acronycta oblonga*" (Cr); New Brunswick, Atlantic Co. (Coll); Trenton VII, 5, Avon IX, 27 (Hk).
1. *ultimus* Cress. Cramer Hill V, 21 (Jn).
1. *utilis* Cress. G. d., parasitic on the Canker worm.
1. *vittifrons* Cress. Long Island (Ashm) and probably New Jersey.
1. *variegatus* Cress. G. d. in the United States (Cress).
1. *vitalis* Cress. Long Island (Ashm), and sure to occur in New Jersey.
1. *velox* Cress. New Jersey (Cress).
1. *versabilis* Cress. Widely distributed; reared from "*Grapta faunus*" and "*Chrysophanus hypophlæas*."
1. *vescus* Prov. G. d. in the United States and Canada (Cress).
1. *vinnulus* Cress. Jamesburg (Sm); Trenton VIII, 23, Clementon VIII, 23 (Hk).
1. *viola* Cress. Long Island (Ashm) and probably New Jersey.
1. *volens* Cress. G. d. in the United States and Canada.
1. *w-album* Cress. Staten Island VI (Ds); Trenton V, 24, VIII, 19 (Hk).
1. *wilsonii* Cress. G. d. in the United States (Cress).
1. *zebratus* Cress. Of general distribution in the United States (Cress).
1. *tharotis* Pack. Reared from "*Phyciodes tharos*."
1. *orpheus* Cress. (*Chasmodon*) Probably occurs in New Jersey.
1. *saucius* Cress. (*Chasmodon*) Trenton VII, 9 (Hk).
1. *nubivagus* Cress. (*Amblyteles*) Long Island (Zabriskie); parasitic on "*Cucullia intermedia*."
1. *tetricus* Prov. (*Probolus*) New York (Ashm) and probably New Jersey.
1. *brevipennis* Cress. (*Exephanes*) Long Island (Ashm) and probably New Jersey.
1. *confirmatus* Cress. (*Exephanes*) Occurs with the preceding.
1. *ultus* Cress. (*Amblyteles*) G. d. in the United States and Canada (Cress).
1. *suturalis* Say. Caldwell (Cr); New Jersey (Cress Coll).
1. *subfuscus* Cress. (*Amblyteles*) Staten Island X (Ds).
1. *semicæruleus* Cress. G. d. in the United States and Canada.
1. *rufizonatus* Cress. (*Amblyteles* and *Probolus*) New Jersey (Cress).
1. *ormenus* Cress. G. d. in the United States and Canada.

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- I. luctus* Cress. Newark, bred from a Noctuid larva (Sm).
- I. indistinctus* Prov. G. d. in the United States and Canada.
- I. improvisus* Cress. New Jersey (Cress).
- I. fraternus* Cress. Massachusetts to Virginia (Cress).
- I. excultus* Cress. New Jersey (Cress Coll).
- I. detritus* Brullé, New Jersey (Cress Coll).
- I. anceps* Cress. Connecticut to Delaware (Cress).
- I. concinnus* Say. (*Plagiotrypes*) New Jersey, probably.
- I. trogiformis* Cress. (*Trogomorpha*) New Jersey (Cress Coll).
- I. cinctitarsis* Prov. Trenton V, 24 (Hk).

HOPLISMENUS Grav.

- H. morulus* Say. Staten Island (Ds); New Jersey III (Jn). Reared from "Grapta interrogationis" and "Vanessa antiopa."

TROGUS Grav.

- T. nubilipennis* Hald. Orange Mts., rare (Sm); parasitic on "Papilio asterias" and "Pyrrharcia isabella."
- T. obsidianator* Brullé. Orange Mts., near Montclair (Sm).
- T. elegans* Cress. Delaware Water Gap VII, 15 (Jn).
- T. brullei* Cress. (*Automalus*) Chester, Newark, New Brunswick from Sphingid larvæ (Sm); Westville VI, 7 (Jn).
- T. copei* Cress. Will probably be found in New Jersey.
- T. canadensis* Prov. Staten Island IX (Ds).
- T. vulpinus* Grav. (*Psilomastix exesorius*) Throughout the State, common V-IX; parasitic on swallow-tail and other butterflies.

Family EVANIIDÆ.

In this family the abdomen is long, flattened transversely and attached by a narrow base to the top of the thorax.



Fig. 257.—*Trogus vulpinus* on chrysalis of *Papilio*, from which it has emerged.

FCENUS Fab.

- F. tarsatorius* Say. Del. Water Gap VII, 9 (Jn); visits flowers of golden-rod.
- F. montanus* var. *incertus* Cress. Visits flowers of parsnip (Vk) and sure to occur in New Jersey.

HYPTIS Illiger.

H. reticulata Say. Caldwell (Cr).

EVANIA Fab.

- E. appendigaster** Linn. A cosmopolitan species, parasitic in egg capsules of roaches, which I have found at Newark and New Brunswick.
- E. lævigata** Oliv. A parasite on the oriental roach or black beetle, and also probably found in New Jersey.

PRISTAULACUS Kieff.

- P. stigmaterus** Cress. (*Aulacus*) New Jersey is the type locality.
- P. subfirmus** Vier. Riverton VII, 17 (Jn) the type locality.
- P. fasciatus** Say. DaCosta VII, 19 (W).

PAMMEGISCHIA Prov.

- P. lovei** Ashm. Palisades V (Lv) the type locality.
- P. pallipes** Cress. (*Aulacus*) New York (Ashm) and probably New Jersey.
- P. burquei** Prov. Reared from "Xiphidria abdominalis."

Super-family CHALCIDOIDEA.

A large number of the parasitic "Hymenoptera" are referable to this series, and they are usually rather stout, with broad head, elbowed antennæ and frequently metallic colors. The wings have few or no veins, are often clothed with short hairs and are occasionally wanting in one sex or both. The ovipositor is more or less concealed, and usually issues from the underside of the abdomen before the tip.

A small number of species are plant-feeders, and some of these, like the "joint-worms," are occasionally injurious. More of them are hyperparasites upon species that are themselves parasitic, and these act as checks to the increase of the primary parasites.

Family MYMARIDÆ.**ANAPHES Halid.**

- A. gracilis** How. Parasitic on the common oyster-shell scale.
- A. conotracheli** Girault. Bred from eggs of the plum curculio.

POLYNEMA Halid.

- P. howardi** Ashm. Should be found in New Jersey.
- P. œcanthi** Ashm. New Jersey (Ashm); a mss. name.

Family TRICHOGRAMMIDÆ.

TRICHOGRAMMA Westw.

T. odontota How. A parasite on "*Odontota suturalis*."

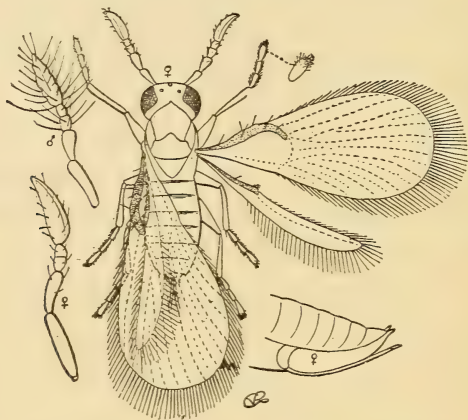


Fig. 258.—An insect egg parasite, *Trichogramma pretiosa*, very much enlarged.

T. pretiosa Riley. An egg parasite which surely occurs in New Jersey.

T. cerasarum Ashm. Reared from the buffalo tree-hopper.

T. intermedium How. Parasitic on "*Grapta*," "*Vanessa*," "*Danais*" and "*Nisoniades*."

T. minutum Riley. Parasitic on "*Limenitis archippus*."

Family EULOPHIDÆ.

CRATOTRECHUS Thoms.

C. orgyiæ Fitch. New Jersey; a parasite of the tussock moth.

SYMPIESIS Först.

S. nigrifemora Ashm. Parasitic on leaf miners of balsam and oak and also of the trumpet leaf-miner of the apple.

S. uroplatæ How. Breeds in "*Odontota suturalis*."

S. tischeriæ Ashm. Breeds in the trumpet leaf miner of apple.

S. nigripes Ashm. Has the same habits as the preceding.

S. quercicola Ashm. South Orange VI, 16; parasitic on petiole borer of maple leaf (Coll).

CIRROSPILUS Westw.

C. niger How. Reared from "*Pyrameis atalanta*."

ELACHISTUS Spin.

- E. proteoteratis* How. Reared from "Proteoteras æsculana."
E. cacœciæ How. Parasitic on "Cac. rosaceana" and "Hyph. cunea."
E. spilosomatis How. Parasitic on "Spilosoma virginica."

STENOMESIUS Westw.

- S. harrisinæ* Ashm. Reared from "Harrisina americana."

MIOTROPIS Thoms.

- M. clisiocampæ* Ashm. New Brunswick, bred from "Clis. americana" (Sm).

LEUCODESMIA How.

- L. typica* How. A parasite on "Euleucanium tulipifera."

EUPLECTRUS Westw.

- E. catocalæ* How. A parasite on Catocala larvæ.
E. plathypenæ How. Parasitic on "Plathypena scabra."
E. frontalis How. Riverton IV, 17 (Jn).

ANOZUS Först.

- A. siphonophoræ* Ashm. Breeds in species of "Siphonophora."

BARYSCAPUS Först.

- B. centricolæ* Ashm. Parasitic on "Holcaspis centricola."

TETRASTICHUS Halid.

- T. racemariæ* Ashm. New Brunswick, parasitic on oak galls "Amphibolips cinerea" (Sm).
T. theclæ Pack. A parasite on "Thecla calanus."
T. banksi How. Breeds in "Holcopelta nitens."
T. chlamytis Ashm. Parasitic on "Chlamys plicata."
T. encyrti Ashm. A hyperparasite bred from the cottony maple scale, Newark VII, 12 (Coll).
T. microrhopala Ashm. Breeds in "Microrhopala xerene."
T. modestus How. Parasite on "Grapta interrogations" and "P. atalanta."
T. productus Riley. A parasite of the Hessian fly.
T. rosæ Ashm. Bred from gall of "Rhodites ignota."
T. saundersi Pack. Parasite of "Thecla calanus" and "edwardsi."
T. scolyti Ashm. Breeds in the fruit bark beetle.

SYNTOMOSPHYRUM Först.

- S. orgyiæ* Ashm. Parasite on the tussock moth.

MELITTOBIA Westw.

M. chalybii Ashm. Parasitic in nest of "Chalybion cœruleum."

M. megachilis Pack. Bred from "Megachile" and "Anthophora."

PERISSOPTERUS How.

P. pulchellus How. Parasite on "Chionaspis pinifoliæ" and "Aspidiotus" sp.

APHELINUS Dalm.

A. mali Hald. Parasitic on woolly apple, cabbage and other plant lice.

A. mytilaspidis LeB. Throughout the State on oyster shell scale and other scales.



Fig. 259.—*Aphelinus fuscipennis*: San José Scale parasite.

A. fuscipennis How. Throughout the State, parasitic on the San José and other scales, sometimes very abundant.

A. abnormis How. A parasite on the oyster shell scale.

A. diaspidis How. Breeds in "Aulacaspis rosæ."

ABLERUS How.

A. clisiocampæ Ashm. Parasite on the Scurfy and other scales.

PHYSCUS How.

P. varicornis How. Parasitic on "Aspidiotus" and "Chionaspis" sp.

PROSPALTA How.

P. aurantii How. Breeds in "Aspidiotus," "Mytilaspis" and other scale species.

COCCOPHAGUS Westw.

- C. lecanii** Fitch. Bred from Cottony Maple scale, Newark V, VII (Coll), and also parasitic on other soft scales throughout the State.
- C. flavoscutellum** Ashm. Bred from Cottony Maple scales VII, 28, and occurs also on other soft scales throughout the State.
- C. fraternus** How. A parasite on "Lecanium persicæ."

ERETMOCERUS Hald.

- E. corni** Hald. Parasitic on "Aleyrodes corni."

DEROSTENUS Westw.

- D. antiopæ** Pack. Reared from "Vanessa antiopa."

HORISMENUS Wik.

- H. fraternus** Fitch. (*Holocopelte*) Bred from the tussock moth.

EUDERUS Halid.

- E. columbianus** Ashm. (*Trichoporus*) Lives in Cecidomyiid galls and is widely distributed (Ashm).

SECODES Först.

- S. phlæotribi** Ashm. Parasitic in "Phlæotribus frontalis."

Family ELASMIDÆ.

ELASMUS Westw.

- E. nigripes** How. Bred from "Lithocolletis gregariella."
- E. albicoxa** How. Reared from "Liminitis archippus."
- E. tischeriæ** How. Reared from "Tischeria solidaginifoliella."

Family PTEROMALIDÆ.

SPALANGIA Latr.

- S. drosophilæ** Ashm. Parasite on the Pommace flies.
- S. hæmatobiæ** Ashm. A parasite of the horn-fly.

CRATOMUS Dalm.

- C. megacephalus** Dalm. New Brunswick VI, 1 (Coll).

CYRTOGASTER Wik.

- C. dineutis** Ashm. Bred from "Dineutes assimilis."

PACHYNEURON Wlk.

- P. altiscuta* How. New Jersey district.
P. micans How. A parasite on the wheat louse.
P. aphidivorum Ashm. Parasitic on the cabbage plant louse.
P. nigrocyaneum Nort. Bred from "Lophyrus abietis."

ISOCRATUS Först.

- I. vulgaris* Wlk. New Brunswick VII, 20 (Sm); reared from "Aphis rosæ," "Agromyza lutea" and "Curculio pomorum."

HOMOPORUS Thoms.

- H. chalcidephagus* Walsh. Parasitic on "Isosoma hordei."
H. subapterus Riley. (Micromelus) A parasite of the Hessian fly.

MERISUS Wlk.

- M. destructor* Say. (Micromelus) Also lives in the Hessian fly.
M. fulvipes Forbes. Also on the Hessian fly.
M. isosomatis Riley. Reared from "Isosoma tritici."

ARTHROLYTUS Thom.

- A. apatelæ* Ashm. Bred from "Acronycta populi."
A. pimplæ Ashm. Parasitic on "Pimpla inquisitoriella."

DIBRACHYS Först.

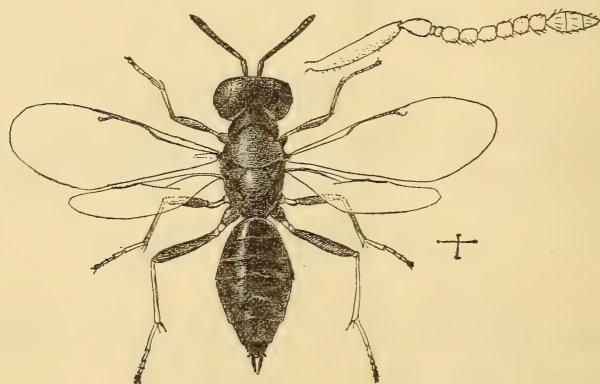


Fig. 260.—*Dibrachys boucheanus*: female adult and antenna of male: both enlarged.

- D. boucheanus* Ratz. Throughout the State. Bred out of the American tent caterpillar and in thousands as a secondary parasite out of *Cecropia* cocoons parasitized by "Pimpla" and "Spilochalcis." Breeds in many other primary parasites.

HYOPTEROMALUS Ashm.

- H. tabacum** Fitch. New Jersey (Ashm); bred from "Apanteles congregatus."

NEOCATALACCUS Ashm.

- N. tylodermæ** Ashm. Trenton IX, 7 (Dn); parasitic on "Tyloderma foveolatum."

CATOLACCUS Thoms.

- C. anthomomi** Ashm. Egg Harbor (Coll), bred from strawberry weevil.
C. cœliodis Ashm. Reared from "Acanthoscelis acephalus."
C. incertus Ashm. Parasitic in strawberry weevil and in species of "Apion."

PTEROMALUS Swed.

- P. gelechiæ** Webster. A parasite of the Angoumois grain moth.
P. fuscipes Prov. New York (Ashm) and probably New Jersey.
P. puparum Linn. Throughout the State; the most common parasite of the cabbage butterfly, also on many other butterfly caterpillars.
P. vanessæ Harris. Parasitic on "Vanessa antiopa" throughout the State.
P. archippi How. Breeds in the common milkweed caterpillar.
P. brassicæ Pack. Another parasite of the cabbage butterfly.
P. calandraræ How. (*Meraporus*) A parasite of the grain weevil "Calandra oryzae."
P. forbesi D. T. Parasite on the Hessian fly.
P. verditer Nort. Bred from "Lophyrus abietis."

DIGLOCHIS Först.

- D. omnivora** Wlk. Bred from "Pyrameis atalanta" and other caterpillars.

EUTELUS Walk.

- E. onerati** Fitch. New York and probably New Jersey.

RAPHITELUS Walk.

- R. maculatus** Walk. New Brunswick IV, VIII, bred from the white pine weevil (Sm); also infests "Hylesinus" and "Scolytus" sp.

PSILOCERA Walk.

- P. rufipes** Ashm. (Metopon) Bred from "Chlamys plicata."

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HETEROXYS Westw.

H. callidii Ashm. Parasitic on "*Callidium antennatum*."

CÆLOPISTHUS Thoms.

C. smithii Ashm. Jamesburg (Sm); a mss. name. Bred from a larva feeding on "*Amelanchier*."

Family ENCYRTIDÆ.

RHOPUS Först.

R. coccois Smith. Parasitic on "*Phenacoccus aceris*."

CHILONEURUS Westw.

C. albicornis How. New Jersey, bred from "*Euleucanium*."

C. diaspidinarum How. Parasitic on the oyster shell scale.

APHYCUS Mayr.

A. brunneus How. Vineland, parasitic on the rose scale (Treat).

A. pulvinariæ How. A parasite of the cottony maple scale.

HOMALOTYLUS Mayr.

H. obscurus How. Parasitic on several of our lady bird beetles; "*H. terminalis*" Say. is an error.

BOTHRIOTHORAX Ratz.

B. noveboracensis How. New York, and probably New Jersey.

B. peculiaris How. Bred from puparia of Syrphid flies (Ashm).

COPIDOSOMA Ratz.

C. gelechiæ How. Beach Haven IX, 6-24, from larvæ of "*Gelechia gallæ-solidaginis*" or an allied species (Coll).

C. truncatellum Dalm. Breeds in a great variety of caterpillars.

C. intermedium How. Recorded from New Jersey.

C. turni Pack. (*Encyrtus*) Parasitic on the "turnus" butterfly.

C. vagum How. Bred from "*Gelechia pseudacaciella*."

PSILOPHRYS Mayr.

P. pallipes Ashm. Parasitic on "*Gelechia gallæsolidaginis*."

ENCYRTUS Dalm.

E. bucculatricis How. A parasite on "*Bucculatrix pomifoliella*."

- E. aphidiphagus* Ashm. Bred from the cabbage louse.
E. artaceæ How. Reared from "*Artace punctistriga*."
E. clisiocampæ Ashm. A parasite on "*Clisiocampa dissstria*."
E. websteri How. Reared from "*Nectarophora granaria*."

DINOCARSIS Först.

- D. thyridopterygis* Ashm. A parasite of the bag or drop-worm.

ARACHNOPHAGA Ashm.

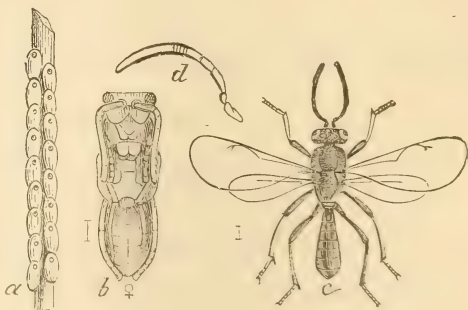
- A. picea* Riley. In egg sacs of spider "*Epeira*" and "*Argiope*."

ANASTATUS Mots.

- A. mirabilis* Walsh. Widely distributed in the United States, from the Atlantic to the Pacific (Ashm).
A. pearsalli Ashm. Parasite in eggs of "*Smerinthus astylus*."

EUPELMUS Dalm.

- E. allynii* French. Common in wheat fields, Clementon V, 22 (Jn); parasitic on the joint worm and Hessian fly.
E. cyaneiceps Ashm. New Brunswick (Sm); Cramer Hill VII, 11 (Jn); bred from "*Bruchus exiguus*."
E. cornigeræ Ashm. Reared from "*Andricus cornigerus*."



- E. hirtus* Ashm. Parasitic on "*Thyanta custator*."

Fig. 261.—Eupelmid, parasite on eggs of katydid:
a, eggs from which parasite has issued, natural size; *b*, pupa, and *c*, adult, enlarged.

EUSANDALUM Ratz.

- E. hubbardi* Ashm. Reared from "*Leptostylus biustus*."
E. ampicervovora Ashm. Bred from "*Amphicerus bicaudatus*."

CHARITOPUS Först.

- C. magnificus* Ashm. A parasite on "*Amphicerus bicaudatus*."

METAPELMA Westw.

- M. spectabile* Westw. United State, from Atlantic to Pacific (Ashm).

Family CLEONYMIDÆ.

PLATYGERRHUS Thoms.

P. scolyti Ashm. Bred from the fruit bark beetle.

PTINOBIUS Ashm.

P. magnificus Ashm. Probably occurs in New Jersey.

CHEIROPACHYS Westw.

C. colon Linn. Also parasitic on the fruit bark beetle and species of similar boring habits.

EPISTENIA Westw.

E. osmiæ Ashm. Parasitic on bees of the genus "Osmia" (Ashm).

Family MISCOGASTERIDÆ.

HALTICOPTERA Spin.

H. brodiei Ashm. Reared from "Biorhiza forticornis."

HEMADAS Crawford.

H. nubilipennis Ashm. (*Habritus*) A parasite of "Solenozopheria vac-cinii"; New Brunswick (Sm).

SEMIOTELLUS Westw.

S. clisiocampæ Fitch. Parasitic on "Clisiocampa sylvatica."

TRIDYMUS Ratz.

T. metallicus Ashm. In willow galls (Ashm); said to be parasitic on "Cecidomyiids."

EUNOTUS Walk.

E. lividus Ashm. Bred from Cottony Maple scale, Newark VII, 12 (Coll).

Family EUCHARIDÆ.

METAGEA Kirby.

M. schwarzii Ashm. (*Pseudometagea*) New Jersey district.

Family PERILAMPIDÆ.

PERILAMPUS Latr.

Fig. 262.—*Perilampus hyalinus*; adult and cocoon; enlarged.

- P. hyalinus** Say. (*cyaneus* Brullé.) Caldwell (Cr); Westville VII, 21 (Jn); DaCosta VII, 5 (Dke); Atlantic Co. VIII, parasite on pine saw-fly (Coll).
P. triangularis Say. Atco VI, 13 (Jn).
P. platygaster Say. Riverton VIII, 11 (Jn).
P. fulvicornis Ashm. New Jersey (Vk).

Family EURYTOMIDÆ.

DECATOMA Spin.

- D. varians** Walsh. New Brunswick (Sm).
D. nubilistigma Walsh. Bred from "*Rhabdophaga batatas*."
D. querci-lanæ Fitch. (*hyalinipennis* Walsh.) New Brunswick (Sm).
 var. *dorsalis* Fitch. (*Eudecatoma*) New Brunswick (Sm); bred from "*Philonix erinacei*" and "*Ceroptres ficus*."

EUDECATOMA Ashm.

- E. batatoides** Ashm. Reared from "*Neuroterus batatus*."

RILEYA Ashm.

- R. cecidomyiæ** Ashm. On Cecidomyiid galls (Ashm).
R. œcanthi Ashm. (*Macrorileya*) Reared from eggs of tree cricket; type locality in New Jersey.

EURYTOMA Illig.

- E. bolteri** Riley. New Brunswick VII, 20 (Sm).
E. bicolor Walsh. Jamesburg VII, 15 (Sm).
E. diastrophii Walsh. Newark V. New Brunswick (Sm); bred from galls of "*Diastrophus nebulosus*."
E. lanulæ Fitch. New York and probably New Jersey.

- E. studiosa* Say. New Brunswick (Coll) in galls of "*Euura salicicola*."
E. auriceps Walsh. New Brunswick (Sm).
E. agrili Ashm. Reared from "*Agrilus otiosus*."
E. crassineura Ashm. A parasite of the fruit bark beetle.
E. magdalidis Ashm. Parasitic on "*Magdalis armicollis*."
E. phlæosini Ashm. Reared from "*Phlæosinus dentatus*."
E. phlæotribi Ashm. Reared from "*Phlæotribus frontalis*."
E. tylodermatis Ashm. Parasitic on "*Tyloderma*" and "*Apion*."

BRUCHOPHAGUS Ashm.

- B. funebris* How. New Brunswick VII, Ocean Co. V (Sm); reared from "*Dasyneura leguminicola*."

EVOXYSTOMA Ashm.

- E. vitis* Saund. Work of larva in grape seeds noted at New Brunswick (Sm).

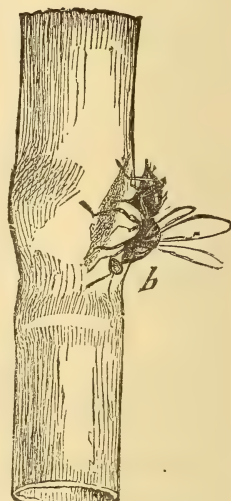


Fig. 263 — Female *Isosoma* ovipositing in stem of wheat: enlarged.

ISOSOMA Walk.

- I. hordei* Harr. Lives in stalk of grain; one of the joint-worms.

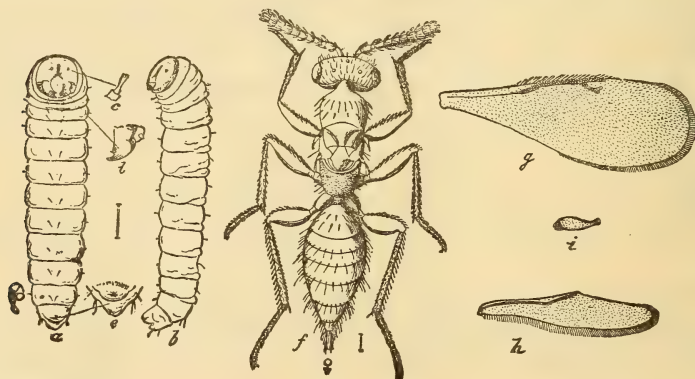


Fig. 264.—*Isosoma tritici*; a, b, larva; f, female; g, fore wing; h, hind wing; other letters refer to details; all much enlarged.

- I. tritici* Riley. Also one of the joint worms. Both of these species occur in New Jersey, but have never been abundant enough to be injurious. They can be controlled by using up the straw completely during the winter.

AXIMA Walk.

A. zabriskei How. A parasite in the nest of "*Ceratina dupla*" (Ashm).

Family CHALCIDIDÆ.

SPIOLOCHALCIS Thom.

S. debilis Say. Parasitic on a variety of primary parasites on lepidopterous larvæ known to occur in New Jersey.

S. mariæ Riley. Common throughout the State, parasitic on the bag-worm, the *Cecropia*, *Polyphemus* and other "Saturniid" moths.

S. braccata Sanb. Throughout the State VIII, IX not rare.

S. nortoni Cress. Newark, on *Limacodes* larva (Sm); Elizabeth VI, 1 (Coll); Anglesea VIII, 13 (Jn).

S. torvina Cress. New Brunswick, Jamesburg VII (Sm); Cramer Hill V (Jn).

S. albifrons Walsh. Bred from "*Pezomachus minimus*."

S. odontotæ How. A parasite on "*Odontota scutellaris*."

S. delira Cress. Anglesea IX, 26 (Dke).

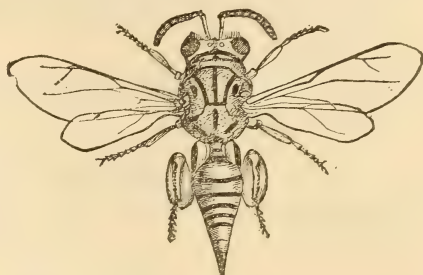


Fig. 265.—*Spilochalcis mariæ*; enlarged.

SMICRA Spin.

S. igneoides Kirby. Sure to be found in New Jersey.

S. maculata Fab. New Jersey, probably.

S. microgaster Say. Cape May VI, 22 (Jn).

S. myrifex Sulz. (*nigrifex* Wlk). New Jersey probably.

CHALCIS Fab.

C. flavipes Fab. New Jersey (Cress Coll).

C. ovata Say. New Brunswick VII, 17 (Coll); Clementon VIII, 6 (Jn); parasitic on a variety of lepidopterous larvæ, large and small.

C. tachinæ How. New Brunswick VII, 29 (Coll).

PHASGONOPHORA Westw.

P. sulcata Westw. Merchantville VII, 14 (Jn); Clementon VI, 26 (Hk); Malaga VII, 20 (GG); Ocean Co. (Coll); bred from "*Papilio*" sp.

LEUCOSPIS Fab.

L. affinis Say. Caldwell (Cr); Trenton VII, 1 (Coll); Riverton IX, 14 (Jn); Westville (Fox); Lakehurst VIII, 7 (Coll); Clementon VIII, IX (div); Belleplain IX, 8 (Dke); bred from nests of leaf-cutter bee.

Family TORYMIDÆ.

ORMYRUS Westw.

- O. vaccinicola* Ashm. Bred from "Solenozopheria vaccinii," and almost certainly occurs in New Jersey.
- O. ventricosus* Ashm. New Brunswick (Sm); parasitic on "Andricus ventricosus."
- O. minutus* Ashm. New Brunswick (Sm); parasitic on "Neuroterus laurifoliae."
- O. rosæ* Ashm. Bred from "Rhodites ignota."
- O. cyaniceps* Ashm. New Brunswick (Coll).

MEGASTIGMUS Dalm.

- M. canadensis* Ashm. Reared from "Biorrhiza forticornis."

OLIGOSTHENUS Först.

- O. stigma* Fab. Bred from "Rhodites rosæ" and "spinosissimæ."

DIOMORUS Walk.

- D. zabriskei* Cress. Parasitic in nests of "Ceratina dupla."

SYNTOMASPIS Först.

- S. advena* Ashm. New Brunswick, in oak galls (Sm).
- S. tubicola* O.S. (*Torymus*) New Jersey, bred from galls of "Andricus flocci" and "A. tubicola."
- S. vaccinariae* Ashm. Common in various "Cynipid" galls (Ashm); a mss. name only.

TORYMUS Dalm.

- T. coeruleus* Ashm. New Brunswick, bred from blackberry galls (Sm), and also from "Cynips cinerea."
- T. sackeni* Ashm. New Brunswick (Sm); out of "Diastrophus nebulosus."
- T. aea* Walk. Will probably be found in New Jersey.
- T. chrysochlorus* O. S. Reared from "Rhodites dichlocerus."
- T. harrisi* Fitch. New York and probably New Jersey.
- T. flavicoxa* O. S. New Brunswick VII, 20 (Sm); from galls of "Rhodites radicum."
- T. bedeguaris* Linn. Reared from "Rhodites rosæ" and "radicum."
- T. brevissimicandus* Ashm. Bred from "Diastrophus nebulosus."
- T. ebrius* O. S. Reared from "Lasioptera vitis."
- T. solitarius* O. S. Out of galls of "Rhodites radicum."

Super-family PROCTOTRYPOIDEA.

In this series we have species in which the ovipositor is retractile into and comes from the end of the abdomen. All of them are parasites, and all stages of other insects may be infested. The tendency is to completeness of venation, and the antennæ are usually straight. Among them are the smallest of the parasites, and on the other hand some of them are of good size. The late Dr. W. H. Ashmead has added much to our knowledge of this super-family, and some of his results are included here.

Family DIAPRIIDÆ.

TRICHOPRIA Ashm.

T. carolinensis Ashm. Occurs in the New Jersey district.

DIAPRIA Latr.

D. agromyzæ Fitch. Reared from "*Agromyza tritici*."

D. meromyzæ Fitch. Parasitic on the wheat-stem maggot.

TROPIDOPRIA Ashm.

T. conica Fab. Reared from the drone-fly, "*Eristalis tenax*."

LOXOTROPA Först.

L. pegomyiæ Brues. A parasite of the cabbage maggot.

GALESUS Curtis.

G. politus Say. Found in the New Jersey district.

PARAMESIUS Westw.

P. terminatus Say. New Jersey district.

Family BELYTIDÆ.

XENOTOMA Först.

X. xanthopus Ashm. Occurs in the New Jersey district.

BELYTA Jur.

B. frontalis Ashm. Should be found in New Jersey,

LEPTORHAPTUS Först.

L. conicus Ashm. Occurs in the New Jersey district.

Family PROCTOTRYPIDÆ.

PROCTOTRYPES Latr.

- P. causatus* Say. Philadelphia (Jn) and sure to be found in New Jersey.
P. linelli Ashm. Long Island (LI) and certainly New Jersey.
P. abruptus Say. Occurs in the New Jersey district.
P. obsoletus Say. Parasitic on "*Stelidota strigosa*."

Family HELORIDÆ.

HELORUS Latr.

- H. paradoxus* Prov. New York (Ashm), and probably New Jersey;
reared from cocoons of "*Chrysopa*."

Family PLATYGASTERIDÆ.

ISOCYBUS Först.

- I. pallipes* Say. Ocean Co., Lahaway V (Sm).

PLATYGASTER Latr.

- P. caryæ* Ashm. A parasite on a walnut *Cecidomyia*.
P. herricki Pack. Parasitic on the Hessian fly.

POLYGNOTUS Först.

- P. diplosidis* Ashm. New Brunswick, reared from the blackberry gall midge (Sm) and also bred from a "*Cecid*" on pine.
P. pinicola Ashm. Clementon V, 27 (Vk); reared from "*Cecid. resinicola*."
P. hiemalis Forbes. Another parasite on the Hessian fly.
P. vernonia Ashm. Reared from "*Vernonia noveboracensis*."

TRICHACIS Först.

- T. rufipes* Ashm. Reared from "*Balaninus nasicus*" and "*Blastobasis glandulella*."

AMITUS Hald.

- A. aleurodinis* Hald. Pennsylvania to District of Columbia (Ashm);
parasitic on the white fly, "*Aleurodes corni*."

ANOPEDIAS Först.

- A. error* Fitch. A parasite of the wheat midge and sure to occur in
New Jersey.

Family SCELIONIDÆ.

SCELIO Latr.

- S. calopteni** Ashm. Reared from "Melanoplus atlanis."
S. œdipodæ Ashm. Parasitic on "Ædipoda" sp.
S. ovivora Riley. Reared from eggs of "Ædipoda carolina."

SPARSION Latr.

- S. famelicum** Say. Parasitic on the carolina locust.

HADRONOTUS Först.

- H. anasæ** Ashm. Reared from the common squash bug.
H. rugosus How. Parasitic on the squash—and other bugs.

BARYCONUS Först.

- B. œcanthi** Ashm. Parasitic on tree crickets "Æcanthus."

MACROTELIA Westw.

- M. virginiensis** Ashm. Reared from "Orchelimum glaberrimum."
M. surfacei Brues. Chester; the type locality; bred from eggs of a locustid found between leaves of pine-cone willow gall (Marsh).

CALOTELEIA Westw.

- C. marlatti** Ashm. Type locality in New Jersey.

PROSACANTHA Nees.

- P. caraborum** Riley. Reared from "Chlænienus impunctifrons."
P. linellii Ashm. Long Island (Ashm) and probably New Jersey.
P. marylandica Ashm. Ocean County (Sm).

ARADOPHAGUS Ashm.

- A. fasciatus** Ashm. Breeds on species of "Pityophthorus."

TRISSOLCUS Ashm.

- T. brochymænæ** Ashm. Parasitic on tree bug, "Brochymena arborea."
T. euchisti Ashm. Reared from "Euchistus servus."
T. murgantiæ Ashm. Infests the harlequin cabbage bug.
T. podisi Ashm. New Brunswick VII, 20, Ocean Co. V (Sm); in "Podisus spinosus."
T. thyanthæ Ashm. Reared from "Thyantha custator" and "Podisus spinosus."

TELENOMUS Halid.

- T. arzamæ** Riley. Reared from "Arzama densa."
T. bifidus Riley. Parasite of "Hyphantria cunea," the fall web-worm.

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- T. clisiocampæ* Riley. Reared from the American tent caterpillar.
T. cœlodasidis Ashm. Parasitic on "*Cœlodasys leptinoides*."
T. graptæ How. Breeds in species of "*Grapta*," "*Vanessa*," "*Chrysophanus*," etc.
T. heliothidis Ashm. A parasite of the corn-worm.
T. ichthyuræ Ashm. Bred out of "*Ichthyura inclusa*."
T. orgyæ Fitch. Bred out of eggs of the tussock or vaperor moth.
T. podisi Ashm. Parasitic in "*Podisus spinosus*" and "*P. modestus*."
T. spilosomatis Ashm. Reared from *Spilosoma virginica*."

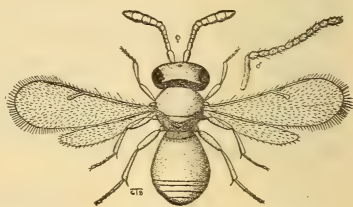


Fig. 266.—*Telenomus heliothidis*; much enlarged.

PHANURUS Thom.

- P. tabanivorus* Ashm. Bred out of eggs of "*Tabanus atratus*."

Family CERAPHRONIDÆ.

CERAPHRON Jur.

- C. destructor* Say. A parasite of the Hessian fly.
C. fuscipes Ashm. New Jersey district.
C. tertius D. T. (*basalis* Ashm.) Sure to occur in New Jersey.

LYGOCERUS Först.

- L. stigmatus* Say. New Brunswick VI, 29, bred out of cherry aphid (Coll).
L. niger How. South Jersey, parasitic on wheat louse VI, VII (Sm).
L. triticum Taylor. Parasitic on wheat louse.

Family PELECINIDÆ.

PELECINUS Latr.

- P. polyturator* Dru. Throughout the State, not rare. A most remarkable species, the female of which has a body nearly two inches long, made up of a few long slender segments. The male is rare, utterly unlike the female, and resembles a wasp more nearly than a parasite.

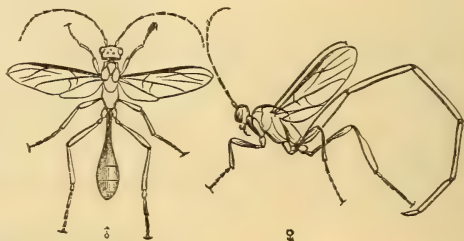


Fig. 267.—*Pelecinius polyturator*; male and female.

Family FORMICIDÆ.

This includes the ants, so well known to all that description is unnecessary. The structural character that distinguishes them is the possession of one or two nodes or scales at the base of the abdomen, forming segments. Ants are usually social, and form colonies, large or small, in which workers or wingless, undeveloped females predominate. The perfect, sexed individuals are winged, but the female strips off these appendages when she starts a colony. The larvæ are footless and helpless grubs, which must be fed with food properly prepared by the workers. Nests are found in all sorts of places, including houses, and in feeding habits they are almost omnivorous. None of our species are directly injurious to field crops, but many of them are indirectly harmful from their habit of protecting plant lice and storing their eggs during the winter. In spring the young lice are colonized on suitable food-plants which could not be otherwise reached, and the carriers thus become injurious, though they do not themselves feed on any cultivated plants. Although many ants eat other insects, yet none of them are specific enemies to any definitely injurious form, hence there is no beneficial habit to their credit.

Some of the larger colonies are complicated assemblages, containing not only the species that form it, but slaves, scavengers, messmates and other associates in great variety. The study of their habits and relations is a fascinating one, and many publications on the general subject are available.

The present list has been prepared by Dr. William Morton Wheeler, our leading American authority on the subject, and the determinations can be relied upon. The notes are from the annotated list published in the Bulletin of the American Museum of Natural History in 1905.

Where ants infest houses they should be attracted to sponges dipped in sugar water, laid near where they run; when a sponge becomes filled with the insects it should be thrown into boiling water and replaced by another. This sort of warfare kept up for a few days so demoralizes the ants that, owing to the inexplicable disappearance of so many of their comrades, they leave the house. Fresh bones or meat scrapings serve as well as sponges, and should be burned when covered. This sort of campaign serves only against those small forms that nest in houses. It is not available against those large forms that come in from outside nests on foraging expeditions.

When ants infest lawns they can be cleaned out by pouring bisulphide of carbon into the main entrance or entrances. The heavy fumes follow the galleries and kill larvæ as well as adults. One application is usually sufficient; but in a very large nest a second may be required. Where a hill is extensive, with many openings, punch three or four holes with a cane at as many points, pour the bisulphide into these and close with the foot.

Names in the previous list not found in this are omitted for lack of authentication, and as the insects occur throughout the year dates are not usually given.

Sub-family PONERINÆ.

There is only one segment in the peduncle between thorax and abdomen, the space between the third and fourth segments is constricted, and the females are furnished with a sting. The species are mostly rare.

STIGMATOMMA Roger.

- S. pallipes** Hald. Chester IX, 6 (Coll); Staten Island, Jamesburg (Ds); Short Hills, Palisades, Lakehurst (Wheeler); Gloucester, Westville (Fox). Occurs rarely in rich dark woods under stones, leaf-mould or rotten logs.

SYSPHINCTA Roger.

- S. pergandei** Roger. Ft. Lee (Silvestri); Short Hills VIII, 8 (Wheeler) Staten Island (Ds). Found under large stones in damp meadows. Dr. Wheeler suggests that "melina" Roger, will also be found in the State.

PROCERATIUM Roger.

- P. crassicorne** Emery. Staten Island (Ds); Anglesea (A E S). Live in rotten wood in damp, shady forests. "P. silaceum" Roger, which has been found in Pennsylvania and on Long Island, will undoubtedly be found in New Jersey as well.

PONERA Latr.

- P. coarctata pennsylvanica** Emery. Recorded from all sections of the State. Occurs in small colonies under stones, mould or rotten wood in open woods.

Sub-family MYRMECINÆ.

MYRMECINA Curtis.

- M. graminicola americana** Emery. Riverton (Vk); Lakehurst, Short Hills VIII, Newfoundland (Wheeler). Usually nests in rotten wood or under stones in damp, shady woods. Rare and local.

MONOMORIUM Mayr.

Monomorium pharaonis.

Fig. 268.

- M. pharaonis** Linn. This is the small red ant usually found in houses throughout the State. It is an introduced species from Europe, which has spread practically all over the world.

- M. minutum** Mayr., var **minimum** (Buckley) Emery. Newfoundland, Lakehurst. (Wheeler); Staten Island (Ds); Milltown V, 30, Lakehurst IX, 27 (Coll); Westville, Riverton (Vk). Common in the pine barrens, making nests in the sand; a minute black species.

SOLENOPSIS Westw.

S. molesta Say. Boonton (Vk); Short Hills VIII, Ft. Lee, Newfoundland (Wheeler); Chester IV, 1, New Brunswick VIII, 21 (Coll). A minute species, which varies greatly in habit, and which may yet prove to be a seriously injurious form. It is sometimes a thief ant in the nest of larger species, but in Illinois has developed a tendency to attack sprouting corn.

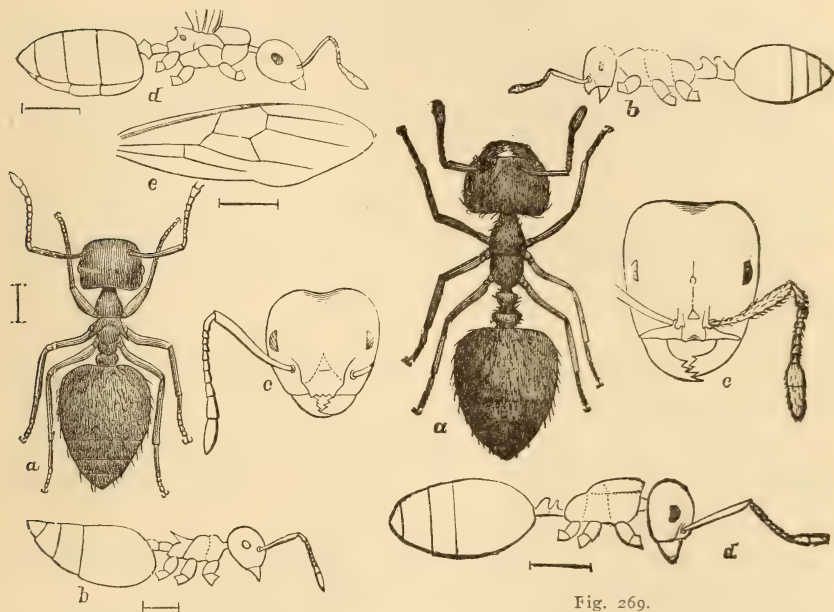


Fig. 269.—*Solenopsis xyloni*; a, b, worker from above and side; c, its head; d, female; enlarged.

Fig. 270.—*Cremastogaster lineolata*; a, b, large worker; c, its head; d, female; e, its wing; f, small worker; all much enlarged.

CREMASTOGASTER Lund.

C. lineolata Say. Common throughout the State and reported by all collectors. Nest in a great variety of places from under bark to under stones. Makes quite a practice of attending plant lice and scale insects.

var. *lutescens* Emery. Described from the State.

var. *cerasi* Fitch. Anglesea, Clementon, Riverton (Vk); Medford (A E S)

var. *pilosa* Pergande. Lakehurst VII (div). This is a common form in the pine barrens.

PHEIDOLE Westw.

- P. pilifera* Roger. Hunterdon Co. IV (Coll); Boonton (Vk); Palisades (Ds); Great Notch, Lakehurst (Wheeler). Nests in sandy or gravelly soil or under stones, making its nest in the pure sand. Feeds on insect food.
- P. morrissi* Forel. Vineland (Morris); Lakehurst (Wheeler). Common in the pine barrens, making its nest in the pure sand.
- P. vinelandica* Forel. Vineland (Treat), Woodbury (Vk); Camden Co. (U S N M). Not uncommon in the pine barrens, where the sand contains an admixture of clay.
- P. davisii* Wheeler. Lakehurst (Wheeler); Lucaston (Dke). Lives in the pine barrens in pure white sand.

STENAMMA Mayr.

- S. brevicorne* Mayr. Riverton (Vk). Nests under stones and leaves in rich, shady woods.
- S. piceum* Emery. Short Hills VIII (Wheeler).

Sub-genus APHÆNOGASTER Mayr.

- S. (A.) treatæ* Forel. Newfoundland, Overbrook (Ds); Vineland (Treat) Lakehurst (div). Nests in the sand in the shade of oaks and pines.
- S. (A.) lamellidens* Mayr. Lakehurst (Wheeler). Nests much like the preceding.
- S. (A.) mariæ* Forel. Jamesburg (Wheeler).
- S. (A.) fulvum* Roger. Caldwell (Cr); Hunterdon Co. IV, 16, Prospertown VI, 1 (Coll). In rotten wood in rather dense forests.
- S. (A.) fulvum aqui* (Buckley.) Emery. Hunterdon Co., Prospertown, Lakehurst (Coll); Jamesburg (Ds); Halifax (Wheeler); Westville (A E S); Anglesea, Clementon (Vk). Under stones in shady woods.
- S. (A.) fulvum aqui* var. *piceum* Emery. Palisades, Halifax (Wheeler); Newfoundland (Ds); Milltown IV 10 (Coll). Common in shady woods. Dr. Wheeler suggests that *S. tennesseense* Mayr. will also occur in New Jersey, as it is known from Pennsylvania and Connecticut.

MYRMICA Latr.

- M. punctiventris* Roger. Fort Lee (Wheeler); Plainfield, Manasquan (Ds); Riverton IV, 14 (Vk); Medford (A E S); Camden. Under stones in moist, shady woods.
- M. punctiventris pinetorum* Wheeler. Lakehurst (Wheeler et als.). Nests in pure sand.
- M. rubra scabrinodis* Nyl., var. *sabuleti* Meinert. Ft. Lee, Newfoundland (Wheeler); Arlington (Coll). Nests in sandy or sunny gravelly places.

- M. rubra scabrinodis* Nyl., var. *schencki* Emery. New Brunswick VII, 20, Milltown V, 30, Lahaway V, XII, Lakehurst VIII, 18 (Coll); Dr. Wheeler has also taken this at Lakehurst.
- M. rubra scabrinodis* Nyl., var. *fracticornis* Emery. Lahaway XII (Brakeley). Make nests in grass tussocks in Sphagnum swamps.

LEPTOTHORAX Mayr.

- L. longispinosus* Roger. Newfoundland, Ft. Lee (Wheeler). Nests in crevices of rocks, in stone fences and similar situations.
- L. curvispinosus* Mayr. Paterson VI, 7, nesting in a golden-rod gall (Gr); Prospertown VI (Coll); Roselle Park (Brb); Ft. Lee (Wheeler); Staten Island (Ds); Riverton, Clementon VI, 6 (Vk); Lakehurst (div), in oak galls (Wheeler). Nests in hollow twigs and empty galls in shady woods.
- L. schaumii* Roger. Staten Island, running on trunk of dead oak in May (Ds); Lakehurst VIII, 18 (Coll); nests in bark.
- L. fortinodis* Mayr. Lakehurst, nesting in the bark of pitch pine (Wheeler).
- L. texanus davisii* Wheeler. Lakehurst (Wheeler); Manumuskin (Dke). Nests in pure white sand and feeds on small insects.

TETRAMORIUM Mayr.

- T. cæspitum* Linn. Ft. Lee (Wheeler); Arlington IV, 6, New Brunswick IV, 26 (Coll); Staten Island (Ds); Camden Co. (Dke). This is an importation from Europe and is known as the "lawn ant." It is spreading slowly, but will probably extend throughout the State before long. At New Brunswick it occurred in a greenhouse, damaging some of the potted plants.

There are three species of "Strumigenys" Sm., which almost certainly occur in the State, although they have not been actually found. They are "S. pergandei" Emery, "S. pulchella" Emery and "S. clypeata" Roger.

ATTA Fab.

- A. septentrionalis* McCook. Milltown, Manasquan (Ds); Prospertown VI, 1 (Coll); Toms River (div); Lucaston (Dke); Lakehurst (Wheeler); Vineland (Treat). Practically confined to the pine regions and is the northern extremity of the range of this "cutting ant." It is the only one of the fungus growing ants whose range extends into the State, and its life cycle is of extreme interest.

Sub-family DOLICHODERINÆ.

There is only a single segment in the peduncle between thorax and abdomen. Sting of the female rudimentary.

DOLICHODERUS Lund.

- D. mariæ** Forel. Milltown V, 30 (Coll); Lakehurst VIII (div); Clementon V, 22 (Vk); Vineland (Treat); Manumuskin, Bamber, Brown's Mills Jn. (Dke). Nests in large colonies in pure white sand around the roots of grass and turkey-beard. Attends plant-lice and mealy-bugs on surrounding plants.
- D. mariæ davisii** Wheeler. Sayreville (Ds); Jamesburg VII (div); Ocean Co. V (Coll).
- D. taschenbergi** Mayr. var. **gagates** Wheeler. Jamesburg (Ds); Lakehurst (div); Clementon VI, 2 (Vk); Iona, Brown's Mills Jn. (Dke). Nests with "mariæ."
- D. plagiatus** Mayr. Jamesburg (Ds); Riverton (Vk); Iona (Dke). Similar in habits to "mariæ," but its colonies are very small.
- D. plagiatus** var. **inornatus** Wheeler. Lakehurst (Wheeler).
- D. plagiatus pustulatus** Mayr. Lakehurst (Wheeler).
- D. plagiatus pustulatus** var. **beutenmulleri** Wheeler. Lakehurst VII, VIII (div).

TAPINOMA Först.

- T. sessile** Say. Throughout the State, common. Nests under stones, dead leaves, logs, etc.
- T. pruinatum** Roger. Milltown (Coll); Halifax, Lakehurst (Wheeler); Atco (Vk). A much smaller species, probably more widely distributed than above records show.

DORYMYRMEX Mayr.

- D. pyramicus** Roger. Lakehurst (Wheeler) and probably throughout the pine barren region. Nests in white sand.

Sub-family CAMPONOTINÆ.

Contains the most common of our species. There is only one segment in the peduncle between thorax and abdomen, there are no constrictions between the abdominal segments, and the females have no sting.

BRACHYMYRMEX Mayr.

- B. heeri depilis** Emery. Great Notch, Newfoundland, Short Hills VIII, Ft. Lee (Wheeler). Nests under stones in shady woods and attends root coccids.

PRENOLEPIS Mayr.

- P. parvula** Mayr. Arlington (Coll); Short Hills VIII, Halifax (Wheeler) Camden, Atco, Clementon (Vk); Lakehurst (div); Brown's Mills Jn. (Dke). Under stones in gravelly and sunny places.
- P. arenivaga** Wheeler. Lakehurst IX, 25 (Wheeler).

Sub-genus NYLANDERIA Emery.

- P. (N.) *imparis* Say. Halifax, Newfoundland (Wheeler); Caldwell (Cr); Staten Island (Ds); Camden Co. (Fox); Chester III, IV, Jamesburg X, Prospertown VI (Coll). Nests in shady oak woods in soil containing more or less clay. A large, very abundant species, which feeds on nectar.
- P. (N.) *imparis* var. *testacea* Emery. Staten Island (Ds); Medford, Clementon (Vk); Lakehurst (div); Lahaway (Coll); a pale form that occurs in the sandy districts.

LASIUS Fab.

- L. *niger* Linn. var. *americanus* Emery. Throughout the State, and perhaps our most abundant species. It harbors and cultivates root-lice and coccids, and nests as readily in cultivated fields as anywhere. It is one of the forms responsible for the distribution of the corn and strawberry root-lice.
- L. *niger* var. *neoniger* Emery. Hewitt, Staten Island (Ds); Newfoundland (Wheeler); Milltown, Trenton, VII (Coll); Lakehurst VIII (div); Anglesea (Vk). A rare form of the preceding; also occurring in all regions of the State.
- L. *brevicornis* Emery. Great Notch, Short Hills VIII, Halifax, Newfoundland, Ft. Lee (Wheeler); Chester VIII, Jamesburg IV (Coll); Lakehurst IX (div). A strictly subterranean species; also cultivating root-lice.
- L. *flavus nearcticus* Wheeler. Great Notch, Halifax, Newfoundland (Wheeler).
- L. *umbratus mixtus* Nyl. var. *aphidicola* Walsh. Great Notch, Newfoundland, Ft. Lee (Wheeler), Caldwell (Emery); Chester X, Jamesburg V, (Coll); Woodbury (Vk).
- L. *umbratus mixtus* var. *affinis* Schenck. "New Jersey" (Mayr).
- L. *umbratus mixtus minutus* Emery. Described from "New Jersey."
- L. *umbratus speculiventris* Emery. Great Notch, Ft. Lee (Wheeler); Caldwell (Emery) the type locality. Under stones or rotten logs in rich, shady woods.

Sub-genus ACANTOMYOPS Mayr.

- L. (A.) *interjectus* Mayr. Short Hills VIII, Newfoundland (Wheeler); Caldwell (Cr); Staten Island (Ds); Lakehurst (div); Lahaway VI (Coll).
- L. (A.) *claviger* Roger. Halifax, Newfoundland, Short Hills VIII, Ft. Lee, Lakehurst (Wheeler); Caldwell (Cr); Staten Island (Ds); Riverton (Vk); Merchantville (Dke). Nests in old logs and stumps in open woods.
- L. (A.) *claviger subglaber* Emery. Milltown V (Coll); Lacy (Dke).

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L. (A.) latipes Walsh. Newfoundland, Ft. Lee (Wheeler); Camden (Sm); Weymouth (Dke). Nests under large stones in grassy fields.

It seems probable that "*L. (A.) murphyi*" Forel. also occurs in New Jersey, since it has been taken on Long Island and within the present limits of New York City.

FORMICA Linn.

F. sanguinea rubicunda Emery. Del. Water Gap (Vk); Milltown V (Coll); Woodbury (A E S). Under stones in grassy places along the edge of woods. It is a slave maker and kidnaps the young of "*F. subsericea*."

F. sanguinea rubicunda var. *subintegra* Emery. Grantwood VIII (div); Newfoundland, Lakehurst (Wheeler); Staten Island (Ds).

F. sanguinea rubicunda var. *integroides* Wheeler. New Brunswick VIII, 5 (Coll).

F. rufa obscuriventris Mayr. Newfoundland (Ds); Eagle Rock, Orange Mts. (Dn).

F. rufa integra Nyl. Staten Island, Jamesburg, Farmingdale (Ds); Lakehurst (Wheeler); Clementon, Sea Isle City (Vk); Brown's Mills Jn (Dke). Makes large nests in or among stones, old logs or stumps; prefers sunny glades or clearings in the forests.

F. difficilis Emery. Halifax, Lakehurst (Wheeler); Jamesburg V (div); Staten Island (Ds).

F. exsectoides Forel. Newfoundland, Staten Island (Ds); Palisades, Alpine (Bt); Halifax, Scotch Plains (Wheeler); Chester IV, Paterson V (Coll). The mound-building ant of the Alleghanies; occurs only in the hilly northern sections of the State.

F. pallide-fulva Latr. Cape May (A E S). Probably the northern limit of its distribution (Wheeler).

F. pallide-fulva schaufussi Mayr. Occurs throughout the State, commonly. Makes small nests in a great variety of places.

F. pallide-fulva schaufussi var. *incerta* Emery. Newfoundland (Wheeler); Staten Island (Ds); Manumuskin (Dke).

F. pallide-fulva nitidiventris Emery. Short Hills VIII (Wheeler); Staten Island (Ds); Milltown VI, Lakehurst VIII (Coll).

F. pallide-fulva nitidiventris var. *fuscata* Emery. Newfoundland, Halifax (Wheeler); Staten Island (Ds).

F. fusca var. *subsericea* Say. Occurs throughout the State, is a mound builder and sometimes forms very large colonies. Prefers sunny, grassy places, and is an attendant on plant-lice.

Dr. Wheeler suggests that the variety "*subænescens*" Emery almost undoubtedly occurs in the hilly portions of the State.

F. fusca subpolita Mayr., var. *neogagates* Emery. Paterson (Wheeler); Newfoundland, Staten Island (Ds).

POLYERGUS Latr.

- P. rufescens lucidus** Mayr. Newfoundland (Wheeler); Camden Co. VI, Clementon (Fox); Lakehurst (Ds), Vineland (Treat). A slave-maker, unable to exist without workers of "*F. schaufussi*," which it kidnaps in the early stages and upon which devolve all the labor of the nest, even to the raising of the young.

CAMPONOTUS Mayr.

- C. castaneus** Latr. Great Notch (Wheeler); Caldwell (Cr); Ft. Lee (Bt); Staten Island (Ds); Sea Isle City (Vk). Nests in the ground under stones or logs, or in obscure mound nests.
- C. castaneus americanus** Mayr. Halifax, Short Hills VIII, Newfoundland (Wheeler); Paterson VI (Coll); Staten Island (Ds); Jamesburg, Lakehurst VIII (div); Iona, Brown's Mills Jn., DaCosta, Manumuskin (Dke).
- C. herculeanus pennsylvanicus** DeG. Throughout the State. This is the common black carpenter ant that nests in old logs, stumps, tree trunks and even in fence posts. Sometimes invades houses in its forays and is extremely persistent and hard to get rid of.
- C. herculeanus pennsylvanicus ferrugineus** Fab. As widely distributed as the preceding, with much the same habits; but much less common.
- C. herculeanus ligniperdus** Latr., var. *novæboracensis* Fitch. Newfoundland, Staten Island, Jamesburg (Ds); New Brunswick (Coll).
- C. fallax** Nyl. var. *nearcticus* Emery. Boonton (Vk); Staten Island (Ds); New Brunswick XI (Coll); Lakehurst VIII, IX (div). Appears to be definitely associated with pine trees, and at Lakehurst is common in the twigs and cones of "*Pinus rigida*."
- C. fallax** Nyl. var. *minutus* Emery. Reported from all sections of the State. Dr. Wheeler records it at Lakehurst nesting in dead twigs of oak and attending aphids on the leaves.
- C. fallax subbarbatus** Emery. Westville (Sm); Riverton (Dke); Cumberland Co. III (Coll). Occurs in hollow stems of dead elder bushes

Super-family VESPOIDEA.

Family THYNNIDÆ.

METHOCA Latr.

- M. stygia** Say. (*bicolor* Say.) Camden Co. VI, VII, Ocean Co. VIII, Cape May VI (Fox); Lucaston V, DaCosta VII (Dke); Clementon VIII (Vk).

Family MUTILLIDÆ.

The females resemble ants in general shape, in being often wingless and in being found running about among the grass in sandy spots. They are densely clothed with hair, however, and are contrastingly colored with black, yellow and orange, the name "velvet ants" being applied from their clothing. They differ from the ants in lacking the nodes at the base of the abdomen, and from our local species further, in having a very long and very hot sting. The males are winged and occur on flowers. In habit the species are diggers, and while some are known to store food for their larvæ, others seem to be parasitic or guests in the nests and cells of bees and other wasps.

MUTILLA Linn.

SPHÆROPTHALMA Blake.

- M. balteola* Blake. Westville (Crn).
M. bexar Blake. Camden Co. VIII (Fox); Lucaston IX, 2 (Dke).
M. canella Blake. Camden, Gloucester Co. VII (Fox); N. Woodbury VI, 21 (Vk); Brown's Mills VI, 21 (CG); Manumuskin VII, 5 (Dke).
M. cypris Blake. (*mutata* Blake.) Throughout the State all season; not rare.
M. lepeletieri Fox. (*fenestrata* Lep.) Throughout the State VII-IX.
M. ferrugata Fab. Throughout the State VII-IX; not rare.
M. harmonia Fox. Palisades VI, 12, Brown's Mills VI, 25 (Dke); Gloucester Co., type locality in New Jersey (Vk); Lakehurst VII, 4 (Coll).
M. macra Cress. South of the Piedmont Plain VII-IX; not rare.
M. scævola Blake. Caldwell (Cr); Westville (Crn); Camden Co. V, 18 (Fox).
M. castor Blake. Westville VIII, Clementon VII, VIII (Vk); Pemberton VII, IX (Hk); Brown's Mills VI, 21 (GG); Lahaway VII, Lakehurst VIII (Coll); DaCosta VII, Iona VI, Manumuskin VI, VIII, IX (Dke).
M. vesta Cress. Milltown VII, Lakehurst VIII (Coll); Malaga IX, (Hk); DaCosta VIII, Brown's Mills VI, Iona VI, Manumuskin VI, IX (Dke).
M. rugulosa Fox. South Jersey, not rare (Fox); the type locality.
M. cariniceps Fox. "New Jersey"; the type locality; DaCosta VII, 20 (Dke); Farmingdale VII, 14 (Jn).

PHOTOPSIS Blake.

- M. pennsylvanica* Lap. Camden Co. IX, 29 (Fox).
M. scæva Blake. Riverton VI, 17 (Jn); reared from cocoons of "Trypoxylon albitarsis," by A. B. Champlain (Vk).

PHOTOMORPHUS Vier.

- M. johnsoni* Vier. Riverton VII, 7 (Jn); the type locality.

TIMULLA Ashm.

- M. hexagona* Say. Throughout the State V, VII-IX; not rare.
M. ornativentris Say. Riverton VIII (Jn); Westville (Crn); Camden Co. VI (Fox); Pemberton VII (Hk); Lakehurst VIII (Coll); Brown's Mills VI (CG); Delair VIII, DaCosta VII, Lucaston IX (Dke).
M. dubitata Smith. Milltown VIII, Lakewood V, Lakehurst VII, VIII, Lahaway VIII, Anglèsea VII, IX (Coll); Brown's Mills VII, 4 (Dke). May be the ♀ of the preceding.
M. promethea Blake. Prospertown IX, Lahaway X (Coll).

EPHUTA Say.

- M. scrupea* Say. Camden Co. (Fox); Clementon VIII, 27 (Vk).
M. dæckii Rohw. Lucaston VIII, 25, Bamber IX, 1 (Dke).
M. vierecki Rohw. Lucaston VIII, 27 (Haim); type locality.
M. zella Rohw. Wenonah VII, 28 (Haim); type locality.

NOMLÆPHAGUS Ashm.

- M. sanborni* Blake. Camden Co. VIII, IX (Fox); Lucaston IX (Dke); Pemberton IX (GG).
M. simillima Smith. Throughout the State V-IX; not common.
M. montivaga Cress. Great Notch IX, 4 (Dke).

PSEUDOMETHOCA Ashm.

- M. canadensis* Blake. Camden Co. V, VII, IX (Fox); Clementon V (Vk); Mt. Holly VIII, Iona VI (Dke); Brown's Mills V, VI (div); Milltown V, Riverton IX, Lakewood V (Coll).

DASYMUTILLA Ashm.

- M. occidentalis* Linn. Throughout the State VII-X.
M. ferruginea Fab. Clementon VIII, DaCosta VII, VIII, Iona VII, VIII, Manumuskin VI, IX, X (Dke); Brown's Mills VI, 21 (GG).

Family MYRMOSIDÆ.

MYRMOSA Latr.

- M. unicolor* Say. (*thoracica* Blake.) Camden Co. VI, VIII, IX (Fox); N. Woodbury VI (Vk).

Family TIPHIIDÆ.

This contains a small group of digging wasps, the best known member of which is a parasite of and effective check to the increase of certain white grubs of the genus "Lachnosterna" or May beetles.



Fig. 271.—A velvet ant, *Spherophthalma occidentalis*.

TIPHIA Fab.

T. inornata Say. Throughout the State VI-IX, parasitic on white grubs.

T. waldenii Vier. Lakehurst VII, 7 (Coll).

T. relativa Vier. Chester (Coll); Lucaston V, IX, Stone Harbor VII (Dke).

T. punctata Rob. Lucaston IV, 10 (Dke).

T. clypeata Rob. Lucaston IX, 24 (Dke).

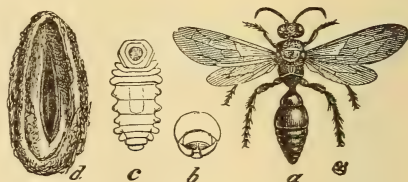


Fig. 272.—White-grub parasite, *Tiphia inornata*; a, adult; b, head of larva; c, larva; d, cocoon.

PARATIPHIA Sichel.

P. algonquina Vier. Clementon VI, VII (Hk), the type locality; Lakehurst VII, Lahaway VIII (Coll).

Family SCOLIIDÆ.

Stout, very hairy wasps; black, banded or spotted with yellow, legs short and strong, abdomen with a very short pedicel. The species burrow in the ground in search of white grubs, in which they lay their eggs and on which the larvæ develop.

SCOLIA Fab.

S. bicincta Fab. Gloucester Co. VIII, 23 (Fox); Westville (Crn); Wenhah VII, 27 (Dke); Clementon IX, 8 (CG); Lahaway VI, 21, Prosper-town VI, 1 (Coll).

S. dubia Say. Newark, Trenton VIII, 14, Hammonton VIII, 27 (Coll); Westville (Crn); Gloucester VIII, 23 (Fox); Belleplain IX, 8 (Dke).

S. nobilitata Fab. Jamesburg VII, 18, Ocean Co. (Coll); Camden Co. VI-29-VIII, 3 (Fox); DaCosta VII, 4-28, Bamber VIII, 11 (Dke).

ELIS Fab.

E. plumipes Dru. Throughout the State in sandy places, more common south of the Piedmont Plain V-VIII.

E. quadrimaculata Fab. (*quadrinotata* Fab.) Monmouth Co. VII, 4 (Fox); Laurel Springs VI, 4; Brown's Mills V, VII, Manumuskin V, VI (Dke).

Family MYZINIDÆ.

MYZINA Latr.

M. interrupta Say. (*hamata* Say.) Riverton IX (Jn); Newbold VIII, Lucaston VIII, Manumuskin IX, Anglesea IX (Dke); Camden Co. (Ashm); Pemberton VI (Hk); Lakewood, Lahaway VIII (Coll).

- M. quinquecincta* Fab. (*namea* Fab.) Westville (Crn).
M. obscura Fab. New Jersey, rare (Bt); Westville (Crn).
M. sex-cincta Fab. Throughout the State VII-IX, common.
M. marginata Say. Sure to be found in New Jersey.

Family SAPYGIDÆ.

These are guests in the nests of bees, such as "*Xylocopa*" and "*Osmia*."

SAPYGA Latr.

- S. centrata* Say. Camden Co. V, 18 (Fox).
S. americana Cress. Will be found in New Jersey.

Family TRIGONALIDÆ.

TRIGONALYS Westw.

- T. sulcatus* Davis. Anglesea (Sm).
T. pulchella Cress. Should occur in New Jersey (Vk).
 An undetermined species is in Mr. Daecke's collection from Lindewold IX, 7.

LYCOGASTER Shuck.

- L. pullatus* Shuck. Orange Mts. VII, 4 (Jn).
L. costalis Cress. Reared from "*Acronycta lobeliæ*" (Vk).

Family BETHYLIDÆ.

PARASIEROLA Carn.

- P. cellularis* Say. (*Goniozus*) New Jersey probably (Ashm).

GONIOZUS Först.

- G. platynotæ* Ashm. Reared from "*Platynota sentana*."

PERISEMUS Först.

- P. prolongatus* Prov. Reared from "*Crambus caliginosellus*."

ANOXUS Thoms.

- A. chittendeni* Ashm. Reared from "*Cis*" sp., and sure to be in New Jersey.

EPYRIS Westw.

- E. bifoveolatus* Ashm. (*Mesitus*) New Jersey probably.
E. rufipes Say. Should be found in New Jersey.

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LÆLIUS Ashm.

L. trogodermais Ashm. Reared from "Trogoderma tarsale."

CEPHALONOMIA Westw.

C. hyalinipennis Ashm. Reared from "Amphibolips cinerea," "Holcaspis omnivora" and "Hypothenemus eruditus."

NEOSCLERODERMA Kieff.

N. tarsalis Ashm. Reared from "Silvanus surinamensis."

PRISTOCERA Klug.

P. armifera Say. Avalon VII, 27 (Hk).

Family CHRYSIDIDÆ.

These are the "cuckoo bees," so called because they lay their eggs in the cells of other bees and wasps, their larvæ depriving the rightful owner of food if they do not actually eat it first. They are of a brilliant metallic blue or green, with a very firm chitinous outer surface, which is often deeply punctured or otherwise sculptured. The abdomen has only a few visible segments, the others being in the form of a retractile tube, at the end of which the small sting is formed. Some of the species are said to be true parasites of saw-flies.

OMALUS Panz.

O. iridescent Nort. Should be found in New Jersey.

O. sinuosus Say. Trenton V, 20 (Hk).

O. læviventris Cress. Manumuskin VI, 11 (Dke).

NOTOZUS Först.

N. marginatus Patt. New Jersey probably.

N. viridicyaneus Nort. "New Jersey" (U S N M).

HEDYCHRIDIVM Perrin.

H. dimidiatum Say. Philadelphia (Jn) and surely in New Jersey.

HEDYCHRUM Latr.

H. obsoletum Say. Riverton VII, 5 (Jn); Cape May VIII, 9 (Dke).

H. violaceum Brullé. Camden, Gloucester Co. VII, 15, Anglesea IX, 4 (Fox); Manumuskin VI, 23 (Dke).

CHRYSIS Linn.

C. perpulchra Cress. Camden Co. VII, 12 (Fox).

C. verticalis Patt. Chester VII, 3 (Coll); Riverton VII, 31 (Jn).

- C. parvula** Fab. Caldwell (Cr); Orange Mts. Lahaway X, 14 (Coll).
C. doriæ Grib. Lahaway VII, 18 (Sm).
C. cœruleans Fab. New Brunswick, Lahaway VI, 24, VII, 18 (Coll); DaCosta V, 17, VII, 20, Manumuskin IX, 15 (Dke).
C. nitidula Fab. Westville (Fox); Lucaston IX, 19, Brown's Mills VI, 23 (Dke); reared from nests of "Odynerus" and "Osmia" in Europe. Fig. 273.—*Chrysis* species.
C. nortoni Aaron. Pennsylvania and probably New Jersey.
C. smaragdula Fab. Lahaway VII, 12 (Sm); DaCosta VII, 20, Lucaston IX, 2, Brown's Mills VII, 5, Iona VIII, 25, Manumuskin VI, 22, Belleplain IX, 8 (Dke).



Family EUMENIDÆ.

These are solitary wasps, with males and females only developed, and the wings are folded lengthwise when at rest. They are predatory and store their cells with insects of various kinds. They may be diggers, borers in pith or wood or may make mud nests of more or less symmetrical form.

ZETHUS Fab.

- Z. spinipes** Say. Caldwell (Cr); Orange Mts. (Sm).

EUMENES Latr.

- E. agilis** Sauss. Philadelphia VIII (Fox) and sure to be found in New Jersey.
E. fraternus Say. Throughout the State, V, VII-IX; this is the common "potter wasp" that makes vase-like mud cells attached to low plants.
E. globulosus Sauss. New Jersey (Cress Coll).
E. verticalis Say. Camden VIII, 3 (Fox).



Fig. 274.—Fraternal potter-wasp, *Eumenes fraternus*; a, wasp; b, its mud cell; c, same opened to show contents.

MONOBIA Sauss.

- M. quadridens** Linn. Throughout the State VI-VIII, locally not rare.

NORTONIA Sauss.

- N. symmorpha** Sauss. Caldwell (Cr).

ODYNERUS Latr.

SYMMORPHUS Wesm.

- O. philadelphiae** Sauss. Caldwell (Cr).
O. debilis Sauss. Lahaway VII, 12 (Sm).

EUANCISTROCERUS D. T.

- O. albophaleratus* Sauss. Westville (Crn); Camden Co. (Fox).
O. birenimaculatus Sauss. Staten Island (Ds); Bloomfield, Woodbury VI, 17, Iona VI, 8, Manumuskine VI, 23 (Dke); Jamesburg VII, 4 (Sm).
O. campestris Sauss. Staten Island (Ds); Essex Co., New Brunswick VI, Jamesburg VII, Swedesboro VII (Coll); Woodbury VI (Dke); Clementon VII, Lucaston IX (Hk).
O. capra Sauss. Throughout the State IX, X, not rare.
O. tigris Sauss. Throughout the State V-VII, IX, X, not rare.
O. uncinatus Say. (*unifasciatus* Sauss.) Caldwell (Cr); Gloucester Co. VII, 15 (Fox); Manumuskine VI, 21 (Dke).
O. quadrisectus Say. Delaware Water Gap VII, 12 (Coll).
O. sæccularis Sauss. Gloucester Co. VII, 15 (Fox); Jamesburg VII, 15, Lahaway VI, 1, Lakehurst IX, 26 (Coll).
O. fulvipes Sauss. Staten Island VII (Ds).

ODYNERUS Latr.

- O. annulatus* Say. New Jersey (Bt); Pemberton IX, 1 (Hk).
O. arvensis Sauss. Gloucester Co. VIII, 24 (Fox).
O. boscii Lep. New Brunswick VII, 24, Swedesboro VII, 15, Lahaway (Sm); Manumuskine IX, 15 (Dke).
O. megæra Lep. Caldwell (Cr); Camden VI, 28, VII, 12 (Fox); Clementon VI, 29 (Hk); Lakehurst VII, 7 (Coll); Manumuskine VI, 4, VIII, 26 (Dke).
O. catskilli Sauss. Staten Island VIII (Ds); Lahaway VI, 2 (Sm).
O. dorsalis Sauss. Gloucester Co. VII, 15 (Fox); Westville VI, 6, Blackwood IX, 9, colony near bank of big Timber Creek VIII, 19 (Vk); Toms River IX, 22 (Dke).
O. foraminatus Sauss. Throughout the State V-VII, IX.
O. hidalgo Sauss. Camden VII, 12, 27 (Fox).
O. fundatus Cress. Lucaston IX, 9 (Hk).

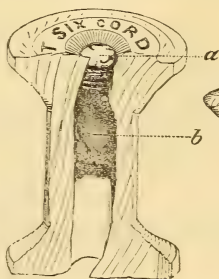


Fig. 275.—*Odynerus flavipes* and its nest built in a spool.

STENODYNERUS Sauss.

- O. anormis* Say. Camden, Gloucester Co. VI, VII (Fox); Lucaston V, IX (div); Iona VII, 13 (Dke); Anglesea IX, 3 (Coll).
O. pedestris Sauss. Caldwell (Cr); Westville VI, 6 (Vk); Camden VI, 24, VII, 12, Cape May V, 14 (Fox).
O. pennsylvanicus Sauss. Camden V-VII (Fox); Westville (Crn).
O. perennis Sauss. Trenton VII, Pemberton VII (Hk); Camden, Gloucester Co. VI-VIII (Fox).
O. conformis Sauss. Gloucester Co. VII, 22 (Fox).

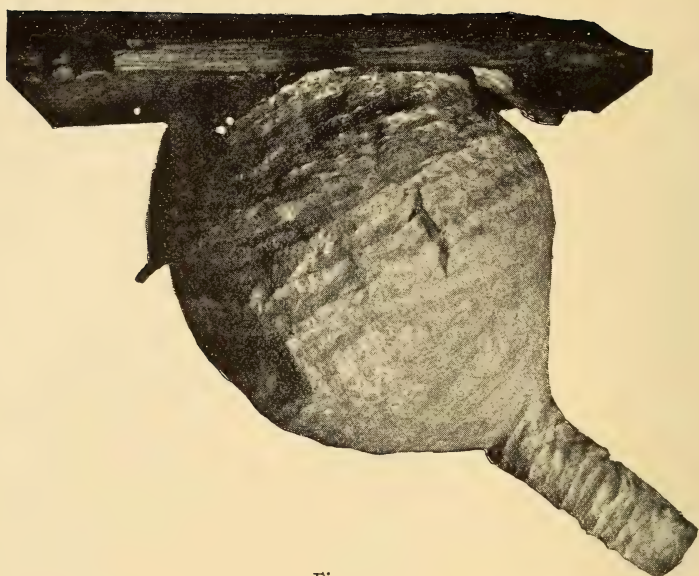


Fig. 277.



Fig. 276.



Fig. 278.

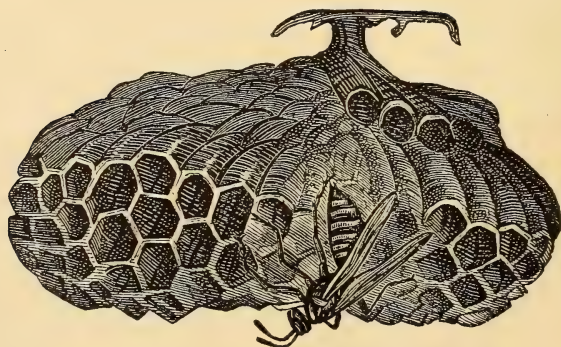


Fig. 279.

Fig. 276.—*Vespa maculata*, white faced wasp.

Fig. 277.—Nest of *Vespa maculata* just started.

Fig. 278.—*Polistes pallipes*.

Fig. 279.—Paper comb of *Polistes*.

- O. vagus* Sauss. Gloucester Co. VII, VIII (Fox); Westville VI, 16 (Vk).
O. collega Sauss. Lucaston IX (Dke); Lakehurst VIII, Barnegat Bay Dist. VI (Coll).

LEPTOCHILUS Sauss.

- O. republicanus* D. T. (*ornatus* Sauss.) Dunnfield VII, 12, stores larvæ of "*Odontota dorsalis*" in pith cells (Sm); Camden VIII, 3 (Fox).

Family VESPIDÆ.

These are the true social wasps—yellow jackets and hornets, which live in colonies containing males, females and workers, the latter, as with the bees, undevelopd females. All of them build paper cells or nests, some of them in the open like the large gray globular "hornets nest," some of them in trunks of trees, beneath overhanging eaves and others in holes in the ground. The insects are pugnacious and resent interference, as any one who has ever disturbed a yellow jacket nest has discovered to his cost. The food consists of honey, pollen and other insects, the larvæ being fed with masticated fragments of insects by the mother or workers. There is no storing of food, and the young are absolutely dependent upon the periodical feeding by the adults. Only the impregnated females hibernate, and each of these starts a colony of its own in spring. The fore wings are folded longitudinally when at rest.

POLISTES Latr.

Species of this genus make paper combs that are not covered, in sheltered places.

- P. annularis* Linn. Staten Island X (Ds); Jamesburg VII, 21 (Sm); Blackwood IX, 19 (Vk).
P. fuscatus Fab. Seems to be rare in New Jersey, the variety "*instabilis*" Sauss. being the only form recorded (Bt).
P. pallipes Lep. (*metricus* Say.) Throughout the State; is the commonest of our species and varies greatly.
P. perplexus Cress. With the preceding and locally as abundant.
P. rubiginosus Lep. New Jersey, rare (Bt).
P. variatus Cress. Newark, Camden Co., Lakehurst VIII, Lahaway IX, Anglesea IX, Cape May IX, not so common (Coll).
P. canadensis Linn. Staten Island III, 15 (Ds).

VESPA Linn.

- V. borealis* Kirby. Caldwell (Cr); this record is open to doubt.
V. crabro Linn. A European species introduced into and now spread throughout the State. It is the largest form that occurs with us.
V. carolina Dru. (*cuneata* Fab.) Staten Island VI (Ds); New Brunswick VIII, Merchantville V, Ocean Co. VI (Coll); Riverton VI, X (Jn); Clementon IV (GG); Woodbury VI, National Park VI, VII, Lucaston IV, Iona VI, Manumuskin V, VI, X (Dke); Mr. Daecke says that the underground nest of this species always has a papered entrance.

- V. diabolica* Sauss. Throughout the State, more or less common all season; makes an underground nest.
- V. germanica* Fab. Throughout the State all season and perhaps the most common of the smaller yellow-jackets; nests in hollow logs, under boards, and more rarely underground.
- V. infernalis* Sauss. New Jersey (Ashm).
- V. maculata* Linn. Common everywhere throughout the State. It is the large white-faced wasp that makes the globular "hornets nests" that are found attached to bushes, trees and sometimes to sheltered places on barns, etc.
- V. occidentalis* Cress. New Jersey (Fox).
- V. vidua* Sauss. Riverton IX (CG); Westville (Cress); New Brunswick IX, Lahaway (Sm); Malaga IX (GG); Lucaston IX, DaCosta VII, Bamber VII, Iona V, VIII, Manumuskin V (Dke).
- V. vulgaris* Linn. Caldwell (Cr); Staten Island (Ds); Camden VI (Fox); Jamesburg VI, Lahaway, Lakehurst IX (Coll).
- V. consobrina* Sauss. New Brunswick VI, 17 (Coll).

Family CEROPALIDÆ.

The "Pompilidæ" of the last edition. Includes rather slender, long-legged solitary wasps with the abdomen united to the thorax by a very short stalk. They are usually velvety black or blue, often with orange bands, wings usually black and kept in constant jerky motion when the insect is moving about. The species prey on spiders and other insects and may be diggers or makers of mud cells under stones, etc. Some are said to be guests in the nests of other diggers.

PSEUDAGENIA Kohl. (AGENIA Dahlb.)

- P. architecta* Say. Riverton IX, 29 (Jn); Merchantville V, Manumuskin X, 20 (Dke); Lahaway VII, 3 (Sm).
- P. bombycina* Cress. Caldwell (Cr); Staten Island V, VI (Ds); Camden VII (Fox).
- P. calcarata* Cress. Jamesburg V, 31 (Coll); Westville VIII, 30 (Vk).
- P. caliptera* Say. Camden Co. VI, 28 (Fox).
- P. iridipennis* Cress. Camden Co. VI, VIII, Gloucester Co. V (Fox).
- P. mellipes* Say. Philadelphia VII, 4 (Fox), and sure to occur in New Jersey.

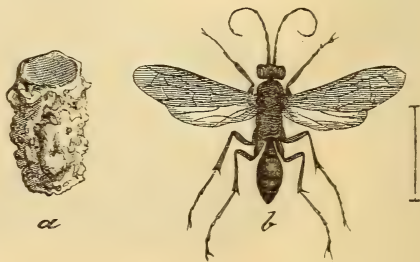


Fig. 280.—*Pseudagenia bombycina* and its cell, which is to be filled with spiders.

- P. cœrulescens* Dahlb. Staten Island (Ds); Camden Co. VIII, IX (Fox).
P. subcorticalis Walsh. New Jersey VIII, 31 (Ashm).
P. varitarsata D. T. (*varipes* Cress.) Will yet be found in New Jersey.
P. pulchrina Cress. Riverton VI, 27 (Jn); Trenton VII, 5, Clementon VIII, 30 (Hk).

CRYPTOCHEILUS Panz. (*SALIUS* Fab.)

- C. fascipennis* Say. (*alienatus* Sm.) Jamesburg (Sm); Riverton VII, 12 (GG); Camden Co. VIII, IX, Gloucester Co. IX (Fox); Westville (Vk).
C. conicus Say. New Brunswick, Jamesburg V (Sm); Camden, Gloucester Co. V, IX (Fox); Clementon VI (Vk); Iona IV, 20 (Dke).
C. fulvicornis Cress. Gloucester Co. VII-IX (Fox); Ocean Co. (Sm).
C. germanus Cress. Trenton VIII, 21 (Hk); Stone Harbor VII, 29 (Dke).
C. nuperus Cress. Gloucester Co. IX, 2 (Fox).
C. pomilius Cress. Camden and Gloucester Cos. VI, IX (Fox).
C. unifasciatus Say. Camden Co. VII, Gloucester Co. VII, VIII (Fox).
C. acceptus Cress. DaCosta VII, 19, Lucaston IX, 28 (Dke).

PEPSIS Fab.

- P. elegans* Lep. Will yet be found in New Jersey.



Fig. 281.—Tarantula hawk, *Pepsis formosa* of the Southwest.

ANOPLIUS Lep. (*POMPILUS* Fab.)

- A. æthiops* Cress. Staten Island IX (Ds); Caldwell (Cr); Riverton VII, Westville IX (Jn); Manumuskin X, 20 (Dke).

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- A. algidus* Smith. Ocean Co. VII, 19 (Fox); Anglesea VIII, 15 (Jn).
- A. americanus* Beauv. Caldwell (Cr); Camden and Gloucester Cos. VI, VII, IX (Fox); South Jersey VII (Sm); Lucaston IX (Dke).
- A. argenteus* Cress. Camden Co. VI, 15 (Fox).
- A. atrox* Dahlb. Throughout the State VI-IX, common.
- A. biguttatus* Fab. Del. Water Gap to Manumuskin V-IX, not rare.
- A. cinctipes* Cress. Camden Co. VI, 28, Ocean Co. (Fox); Manumuskin VI, 23, Stone Harbor VII, 5 (Dke).
- A. cylindricus* Cress. Camden Co. VI, VII (Fox); Swedesboro VII (Sm); DaCosta VII (Dke).
- A. divisus* Cress. Camden Co. IX, 7 (Fox); Iona VI, 8 (Dke).
- A. ferrugineus* Say. Riverton VIII, 17 (Dke); Malaga IX, 15 (Hk).
- A. maurus* Cress. ♀ (*funereus* St. Farg. ♂) Manumuskin VI, 23 (Dke).
- A. fuscipennis* Lep. G. d. south of Piedmont Plain VI, VII.
- A. hyacintheus* Cress. Gloucester Co. IX, 21 (Fox); Swedesboro VII, 15 (Sm).
- A. ingenuus* Cress. Camden IX, 7, Gloucester VII, 19 (Fox); Westville VI, 19 (Vk); Iona VI, 16 (Dke); Lahaway IX, 26 (Coll).
- A. interruptus* Cress. Camden Co. VII, Gloucester Co. VIII, IX (Fox); Clementon VIII (Vk); Swedesboro VII (Sm); Lucaston VIII (Dke).
- A. marginatus* Say. Chester VII, Jamesburg VIII (Coll); Staten Island IX (Ds); Camden VI (Fox); Clementon VIII (Vk); Lahaway VIII (Sm); Iona VI, Manumuskin VI (Dke).
- A. maurus* Cress. Riverton VI (Vk); Gloucester Co. VIII (Fox); Ocean Co. (Sm).
- A. posterus* Fox. Camden Co. VII (Fox).
- A. philadelphicus* Lep. Throughout the State VII-X, locally common.
- A. relativus* Fox. Chester, Lahaway, Anglesea VIII (Coll); Avalon VII (CG).
- A. subviolaceus* Cress. Camden Co. VIII, IX, Atlantic Co. VI (Fox); Clementon V, 9 (Vk); Gloucester Co. VII, Ocean Co. (Coll).
- A. tenebrosus* Cress. Camden Co. VII, VIII (Fox); Gloucester Co. VII, Lahaway IV (Coll); Clementon IV, Lucaston IX, Manumuskin IV, V, X (Dke).
- A. tropicus* Fab. Throughout the State VI-IX.
- A. virginienensis* Cress. Monmouth Co. VII, 4 (Fox).
- A. mariæ* Cress. Great Notch IV, 8 (GG); Manahawkin IX, 5 (Hk).
- A. pompilus* Cress. Recorded from New Jersey (Ashm).
- A. luctuosus* Cress. Lake Hopatcong (Fox); Barnegat Bay Dist. VII (Coll).

APORUS Spinola.

- A. fasciatus* Smith. Camden Co. VIII, 24 (Fox); N. Woodbury VI, 22 (Vk); Lucaston V, 30 (Dke); Atlantic Co. VI, 24 (Coll).

CEROPALES Latr.

- C. bipunctatus* Say. Chester IX, 16 (Coll); Caldwell (Cr); Newark, Ocean Co. (Sm); Riverton IX, 10 (Vk); DaCosta VIII, 3 (Dke).
C. fraterna Smith. Trenton V, 24, VIII, 21 (Hk).
C. longipes Smith. Trenton VIII, 3 (Hk).

Super-family SPHECOIDEA.

This includes a large series of digger and other wasps, all of them solitary, most of which provision their nests or cells with other insects. Some are parasitic, and, as a whole, the series is decidedly useful.

Family PEMPHREDONIDÆ.

Usually slender, rather small wasps, shining black in color. They burrow in the pith of dry branches, making very irregular and complicated channels. Quite generally they store their nests with plant lice.

PSEN Latr.

- P. cressoni* Pack. Camden Co. IX, 7 (Fox), IX, 22, on flowers of aster (Vk); Woodbury VI, 17, Lucaston IX, 12 (Dke).
P. denticulatus Pack. Camden Co. IX, 7 (Fox).
P. leucopus Say. New Brunswick V, 27 (Coll).
P. niger Pack. New Jersey (U S N M).
P. nigrescens Rohw. Clementon VI, 30 (Hk).
P. pauper Pack. Camden Co. VIII, 24 (Fox); Westville (Crn).
P. perplexa Rohw. Camden Co. VIII, 6 (Fox).
P. striatus Vier. Westville VIII, 30, the type locality (Vk); Avalon VI, 9 (Jn).
P. longicornis Fox. Westville VIII, 30 (Jn).
P. johnsoni Vier. Riverton VI, 10 (Jn), the type locality.
P. maculipes Fox. North Woodbury VI, 13 (Vk).

PEMPHREDON Latr.

- P. concolor* Say. Camden Co. VII, 27 (Fox).
P. bipartior Fox. New Brunswick VI, 20 (Coll); Anglesea IX, 8 (Dke).
P. angularis Fox. New Brunswick VI, 10 (Coll).
P. inoratus Say. (Cemonus) New Jersey (Cress Coll).
P. harbecki Rohw. (Cemonus) Trenton VII, 5 (Hk).

STIGMUS Jur.

- S. americanus* Pack. Camden Co. VI, 28 (Fox).

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SPILOMENA Shuck.

S. pusilla Say. New Jersey probably.

PASSALÆCUS Shuck.

P. annulatus Say. Camden Co. VII, 28 (Fox).

P. mandibularis Cress. Northern New Jersey (Ashm).

P. rivertonensis Vier. Riverton VI, 17 (Jn); the type locality.

Family AMPULICIDÆ.

Curious slender wasps, with very long prothorax, a conic head with the base in front, and a clypeus like a beak. They are very rare and are said to prey on cockroaches.

RHINOPSIS Westw.

R. canaliculata Say. Sure to be found in New Jersey.

Family SPHECIDÆ.

This family is easily recognized by the long slender pedicel or stalk connecting the thorax with the main bulb of the abdomen. Among them are the common mud-daubers that plaster their clay or earthen cells against out-houses and under porches, sometimes inside of shutters or in similar sheltered places. These cells are filled with caterpillars, spiders, grasshoppers or the like, stored by the mother wasp as food for the larva. Some species are true diggers and make underground cells only. All of them may be considered as beneficial.

SCELIPHON Klug.

S. cementarium Dru. Throughout the State and the most abundant of our mud-daubers. The variety "architectus" Say. occurs with the type and as commonly, while "lunatum Fab. (canadensis Sm)" has been taken on Staten Island (Ds).

CHALYBION Dahlb.

C. cæruleum Linn. Throughout the State VI-IX, not rare.

SPHEX Linn. (AMMOPHILA Kirby.)

S. arvensis Dahlb. Staten Island (Ds); g. d. in New Jersey (Bt).

S. conditor Smith. Long Island, and sure to occur in New Jersey.

S. gracilis Lep. Caldwell (Cr); Chester, Orange Mts., Jamesburg VII, 11, Ocean Co., Swedesboro VII, 16 (Coll); Lucaston VI, 27, IX, 12, Manumuskine VIII, 17 (Dke).

S. procera Dahlb. (gryphus Sm.) Throughout the State VI-X.

- S. intercepta* Lep. Jamesburg VII, Gloucester VII (Coll); Westville (Crn).
S. extrematata Cress., var. *pictipennis* Walsh. Staten Island (Ds); Chester, New Brunswick VII, Jamesburg VII (Coll); Riverton (Jn).
S. urnaria Klug. Caldwell (Cr); Camden Co. (Fox); Palisades VIII, 14, DaCosta V, 18, Iona VI, 16 (Dke).
S. violaceipennis Lep. Ocean Co. (Coll).
S. vulgaris Cress. Chester, Middlesex Co. VII, Jamesburg VII, Lahaway X (Coll).
S. strenuus Cress. Ocean Co., Lakehurst VII, 4 (Coll).

CHLORION Latr.

- C. cyaneum* Dahlb (*cæruleum* Dru). Throughout the State VI-IX.
 var. "ærarium" Patton. With the type and really the more common.
 "C. nearcticus" Rob. is the same.
C. abdominalis Cress. (*Harpactopus*) Ocean Co. (Sm); DaCosta VII, 4, 28, Manumuskin VIII, 17 (Dke).
C. bifoveolatum Tasch. (*Sphex*) Newark, New Brunswick VII, 14, Gloucester Co. VII, 15, Ocean Co., Anglesea VII, 12 (Coll).
C. atratum Lep. (*Priononyx* = *Sphex brunneipes* Cress.) Throughout the State VII-IX, locally not rare.
C. thomæ Fab. Westville (Crn); Delair VIII, DaCosta VII, Lucaston IX (Dke).
C. aztecum Sauss. (*Isodontia macrocephalus* Fox.) Clementon IX, X, 4 (div); Belleplain IX, 8 (Dke); Manahawken IX, 6 (Hk).
C. auripes H. T. Fern. (*Isodontia tibialis* St. Farg). Throughout the State VI-IX, not rare.
C. harrisi H. T. Fern. (*Isodontia philadelphia*) Caldwell (Cr); Westville (Crn); Lucaston IX, 12 (Dke); Clementon IX, 4 (CG); Ocean Co. (Coll).
C. bridewelli H. T. Fern. Belleplain IX, 8 (Dke).
C. ichneumonea Linn. (*Sphex*). Common throughout the State.
C. pennsylvanicum Linn. (*Sphex*) Throughout the State. common.

Fig. 282.—*Chlorion ichneumonea*.

Family PHILANTHIDÆ.

Rather small or medium sized wasps with a broad, thick head, the abdomen constricted at base but not petiolated, males with brushes of

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long hair on each side of the clypeus. They burrow in the ground and store their cells with beetles or with small digger bees.

CERCERIS Latr.

- C. bicornuta** Guer. Camden Co. VII, 22 (Fox); Manumuskin VIII, 17 (Dke); Anglesea VII-IX (div).
- C. clypeata** Dahlb. Chester IX, 16 (Coll); Staten Island (Ds); Hammononton VIII, 23 (Dke); Toms River (Bt); Anglesea VI, 22 (Sm).
- C. compacta** Cress. Caldwell (Cr); Philadelphia VII, 23 (Fox).
- C. dentifrons** Cress. Philadelphia IX (Fox) and sure to be in New Jersey.
- C. deserta** Say. Common throughout the State.
- C. dufouri** Guer. Camden Co. VII, Gloucester Co. VII, IX (Fox); Anglesea VII (Coll).
- C. flavofasciata** Sm. Lahaway VII, 12 (Coll).
- C. fumipennis** Say. Westville (Crn); Delair VIII, Belleplain IX, 8 (Dke); Farmingdale VII (Jn); Atlantic Co. VI (Fox); Lahaway VII, Lakehurst VIII (Coll).
- C. venator** Cress. Westville VII-IX (div); DaCosta VII (Dke); Gloucester Co. VII (Fox); Anglesea VIII, 8 (Vk).
- C. robertsonii** Fox. Lahaway VII, 12 (Sm).
- C. imitator** Cress. Belleplain IX, 8 (Dke).
- C. fulvipes** Cress. Trenton IX, 2 (Hk).

EUCERCERIS Cress.

- E. laticeps** Cress. Gloucester Co. VII, 27, VIII, 23 (Fox).
- E. zonatus** Say. Sure to occur in New Jersey.

PHILANTHUS Fab.

- P. vertilabris** Fab. (*Pseudanthophilus*) So. Jersey VI, 2 (Sm).
- P. bilunatus** Cress. (*Anthophilus*) Riverton IX (Vk); Camden Co. VIII, IX (Fox); Merchantville VIII (Dke); Clementon IX (CG); Lahaway (Sm).
- P. dubius** Cress. (*Anthophilus*) Clementon VI, (Hk); Swedesboro VIII (Sm).
- P. politus** Say. Throughout the State VI-IX, not rare.
- P. gibbosus** Fab. (*punctatus* Say). Throughout the State VII-X, common.
- P. solivagus** Say. Chester IX, 14 (Coll); Riverton IX, 19 (Hk); Gloucester Co. VII, 24 (Fox).
- P. sanborni** Cress. Staten Island (Ds); Riverton VIII (Vk); Swedesboro VII, Ocean Co. (Coll); Pemberton IX (GG); Wenonah VI, Manumuskin VI (Dke).



Fig. 283.



Fig. 284.

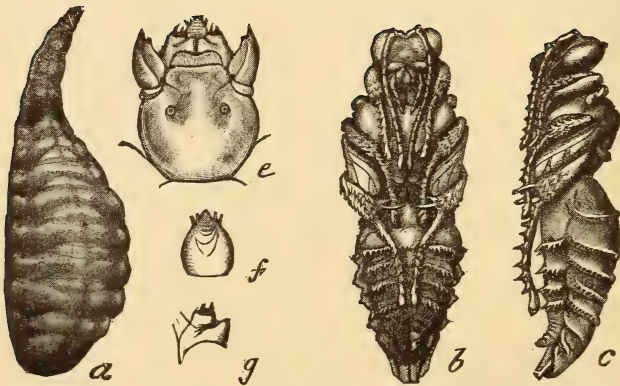


Fig. 285.

Fig. 283.—*Sphecus speciosus*, carrying off a Cicada to its burrow.

Fig. 284.—Larva of *S. speciosus* feeding on the Cicada buried by its parent.

Fig. 285.—*Sphecus speciosus*; a, larva; b, c, pupa; from below and side; e, f, g, details of structure.

APHILANTHOPS Patt.

A. frigidus Smith. Camden Co. VII, 12 (Fox); Lakehurst VII, 7 (Coll).

Family BEMBECIDÆ.

Handsome, yellow-marked wasps of moderate size, the abdomen broad at base, not stalked. The labrum or upper lip is very long, triangular and pointed. The insects burrow in sandy places and feed their larvæ with flies.

BEMIDULA Burm.

B. quadrifasciata Say. Throughout the sandy areas south of Piedmont Plain, more common in the pines VII-IX.

B. ventralis Say. With the preceding and ranges further north; recorded from Clifton IX, 4 (GG).

STICTICA III. (MONEDULA Latr.)

S. carolina Fab. South of Piedmont Plain, g. d. VII-IX; the largest of the family, and not common.

BEMBEX Fab.

B. pruinosa Fox. Anglesea VIII, 25 (Kemp).

B. spinolæ Lep. Throughout the sandy areas south of Piedmont Plain; also at Sandy Hook (Bt); taken on a cow in the act of killing a "Tabanus nigrovittatus" (Dke).

B. cinerea Handl. Anglesea VII, 12 (Coll); Cape May (Vk).

MICROBEMBEX Patt.

M. monodonta Say. Throughout the State in sandy places, not common.

Family STIZIDÆ.

SPHECIUS Dahlb.

S. speciosus Dru. Throughout the State VII, IX, but local. The largest of all our digger wasps preying upon the Cicadas or harvest flies, which are gathered and stored in underground galleries as food for the larvæ.

Family GORYTIDÆ.

GORYTES Latr.

G. nebulosus Pack. Lahaway VII, 1 (Sm); New Jersey (Pack).

G. phaleratus Say. (*Hoplisis fulvipennis* Sm.) Del. Water Gap VII, 8 (Jn); Chester VII, 19, Jamesburg VIII, 4, Gloucester VII, 15 (Coll); Staten Island VII (Ds).

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- G. simillimus* Sm. New Jersey, latter part of June (Fox).
G. bipunctatus Say. (*Euspongius*) Great Notch IX, 8 (GG); Camden Co. VII, 9, IX, 7 (Fox); Clementon VIII, 27 (Vk).
G. denticulatus Pack. Riverton VI, 20 (Hk).
G. nigrifrons Smith. Orange Mts. VIII, 29 (Coll).
G. microcephalus Handl. Camden Co. VI, 28 (Fox).
G. propinquus Cress. Trenton VIII, 5, 21 (Hk).

Family MELLINIDÆ.

Abdomen petiolate, smooth and shining; the species prey upon flies, which some species capture by feigning death.

MELLINUS Fab.

- M. bimaculatus* Say. Riverton VIII, 11 (Vk); Westville (Fox); Lucaston IX, 17 (Dke); Lahaway X, 14 (Coll).

Family ALYSONIDÆ.

BOTHYNOSTETHUS Kohl.

- B. distinctus* Fox. Camden Co. VII, VIII (Fox), the type locality; Atlantic Co. (Sm).

ALYSON Jur.

- A. melleus* Say. Camden Co. VII, 6, VIII, 10 (Fox).
A. oppositus Say. Camden, Gloucester Co. VII, VIII (Fox); Westville (Crn).

Family NYSSONIDÆ.

NYSSON Latr.

- N. lateralis* Pack. Philadelphia VI (Fox), and sure to be found in New Jersey.
N. plagiatus Cress. Camden Co. VII, 19, 27 (Fox).
N. æqualis Patt. Camden, Gloucester Co. VII (Fox); Westville VIII, 1 (Vk).
N. opulentus Gerst. (*Brachystegus*) Camden Co. VI, 28 (Fox).
N. submellipes Vier. Riverton VIII, 7 (Jn); the type locality.
N. texanus Cress. Pemberton VII, 3 (Hk).
N. tramosericus Vier. Visits flowers of yarrow, "*Achillea millefolium*" (Vk).
N. dæckeï Vier. Lucaston V, 30 (Dke); the type locality.

Family CRABRONIDÆ.

Rather small diggers, with an unusually large quadrate head. They are not uniform in habit, but many live in pithy stems, burrow in dead wood or make use of an old cavity. They store their cells with flies, plant-lice, other insects or even spiders.

CRABRO Fab.

- C. maculatus* Fab. Staten Island VII (Ds); Riverton IV, 31 (Jn); Camden IX, 13 (Kp).
- C. trapezoideus* Pack. Camden Co. VII, 5 (Fox); Westville (Crn).
- C. interruptulus* D. T. (*Solenius interruptus*) Throughout the State VI, VII.
- C. producticollis* Pack. (*Solenius*) Throughout the State VI, VII.
- C. montanus* Cress. (*Ectemnius*) Philadelphia VIII (Fox), and sure to occur in New Jersey.
- C. corrugatus* Pack. (*Ectemnius*) Camden Co. VIII, 30 (Fox).
- C. obscurus* Smith. (*Clytochrysus*) Throughout the State VI-VIII.
- C. septemprionalis* Pack. Camden Co. VII, 27 (Fox).
- C. nigrifrons* Cress. Throughout New Jersey (Vk).
- C. paucimaculatus* Say. (*Xestocrabro*) Camden, Gloucester Co. VII, VIII (Fox).
- C. bisexmaculatus* Vier. (*Xestocrabro sexmaculatus* Say.) Caldwell (Cr); Staten Island (Ds); Camden, Gloucester Co. VII, VIII (Fox); Clementon V, 12 (Vk).
- C. trifasciatus* Say. Chester VIII, 15 (Coll); Staten Island VIII (Ds); Camden Co. VII, VIII (Fox).
- C. bimaculatus* Say. Great Notch VIII, 21, Riverton VIII, 17 (Dke); one of the specimens taken with "*Lucillia cæsar*" as its prey.
- C. stirpicola* Pack. (*Xylocrabro*) Camden, Gloucester Co. VII, VIII (Fox); Atlantic Co. (Coll).
- C. scaber* Lep. Camden Co. VII (Fox); Manumuskine VI, 23 (Dke).
- C. decem-maculatus* Say. (*Hypocrabro*) Riverton IX, 31 (Jn); Camden Co. VII, 27 (Fox); Avalon VI, 9 (Kp).
- C. chrysargyrus* Lep. (*Pseudocrabro*) Jamesburg IX (Coll); Camden Co. VII (Fox).
- C. bigeminus* Patt. (*Protothyreopus*) Camden VIII, 12 (Fox); Lahaway (Coll).
- C. rufifemur* Pack. Manumuskine VIII, 17 (Dke).
- C. argus* Pack. (*Thyreopus*) Camden Co. VI, 28, VIII, 24 (Fox).
- C. provancheri* Fox. (*Thyreopus*) Will be found in New Jersey.
- C. cribrellifer* Pack. Long Island (Ashm), and probably in New Jersey.
- C. vernalis* Fox. (*Synothyreopus*) Clementon V, 10-28 (div); DaCosta V, 18, Brown's Mills V, 21 (Dke).

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- C. tumidus* Pack. (*Synothyreopus*). Westville (Crn); Avon IX, 27 (Hk); Lahaway X, 14 (Coll); Lucaston VI, 27, Belleplain IX, 8 (Dke).
C. viereckii Rohw. (*Synothyreopus*) DaCosta V, 17 (Dke).
C. cingulatus Pack. (*Paranothyreus*) Camden Co. VIII, IX (Fox).
C. rugicollis Vier. Riverton VII, 8 (Jn); the type locality.
C. hilaris Smith. DaCosta V, 18 (Dke).
C. nitidiventris Fox. (*Cuphopterus*) Trenton V, 24 (Hk); Camden Co. VII, 5 (Fox), the type locality; Collingswood VII, 17 (GG).
C. errans Fox. (*Lindenius*) Gloucester Co. VIII, 16 (Fox).
C. sulcus Fox. (*Crossocerus*) Long Island (Ashm) and probably New Jersey.
C. dæckii Rohw. (*Crossocerus*) Lucaston V, 28 (Dke).
C. minimus Pack. (*Crossocerus*) Camden Co. V, 9, VIII, 9 (Fox).
C. scutellifer D. T. (*scutellatus* Say.) Camden Co. V, 18 (Fox).
C. maculiclypeus Fox. N. Woodbury VI, 13, Clementon V, 30, VI, 2 (Vk); Lucaston V, 30 (Dke).
C. flavitrochantericus Vier. Riverton VI, 6, the type locality (Vk).
C. impressifrons Smith. (*Blepharipus*) Riverton VIII, 8 (Jn) IX, 7 (CG).
C. harringtonii Fox. Trenton VIII, 11 (Hk).
C. nigrior Fox. (*Blepharipus*) "The unique type is from New Jersey" (Vk).
C. occidentalis Fox. (*Alliognathus*) Riverton V, 30 (Vk), VIII, 25 (Jn).
C. pedicellatus Pack. (*Rhopalum*) Riverton V, 30, Gloucester Co. IX, 7 (Vk).
C. rufigaster Pack. (*Rhopalum*) Riverton VIII, 17 (Jn); New Jersey (Ashm).

ANACRABRO Pack.

- A. ocellatus* Pack. Staten Island VI, 2 (Ds); Camden Co. VIII, 10 (Fox); Westville (Crn); Farmingdale VII, 14 (Coll); Manumuskin VI, 23 (Dke).

Family OXYBELIDÆ.

NOTOGLOSSA Dahlb.

- N. emarginata* Say. Throughout the State V-VII, not rare.

OXYBELUS Latr.

- O. quadrinotatus* Say. Jamesburg V (Coll); Camden, Gloucester Co. VIII (Fox).
O. subulatus Rob. (*mucronatus* Pack.) Throughout the State VI, VII.
O. cornutus Rob. Camden, Gloucester Co. VII, 28, VIII, 5 (Fox).
O. packardi Rob. Camden Co. VII, 12 (Fox).
O. lætus Say. Camden Co. VII, 12, VIII, 9 (Fox).

Family LARRIDÆ.

Head broad, closely applied to the thorax, abdomen not stalked, oval; middle tibia with one spur. Make burrows in sandy places and provision them chiefly with grasshoppers, crickets and the like.

ASTATA Latr.

- A. *bicolor* Say. Gloucester Co. VIII, 16 (Fox); New Jersey (Cress Coll).
- A. *unicolor* Say. Throughout the State in August, not rare.
- A. *pygidialis* Fox. Camden Co. (Fox).
- A. *occidentalis* Cress. Philadelphia VIII (Fox) and probably New Jersey.

LARRA Latr.

- L. *analís* Fab. (*cressoni* Fox, *americana* Cress.) Camden, Gloucester Cos. VII, VIII (Fox); Swedesboro VII, 15 (Coll); Clementon VIII, 13, 27 (Vk).
- L. *pennsylvanica* Beauv. Camden, Gloucester Co. VIII, IX (Fox); Westville (Crn).

NOTOGONIA Costa.

- N. *argentata* Beauv. G. d. south of Piedmont Plain V-VIII, not rare.

ANCISTROMA Fox.

- A. *distincta* Smith. Throughout the State VIII, IX, not rare.

TACHYSPHEX Kohl.

- T. *tarsatus* Say. Camden, Gloucester Cos. VII, VIII (Fox); Clementon V, 19 (Vk); Anglesea VI, 25 (Sm).
- T. *dubiosus* D. T. (*dubius* Fox.) Camden Co. VIII, 24 (Fox), the type locality; N. Woodbury VI (div); DaCosta VII, 28 (Dke).
- T. *punctifrons* Fox. Camden Co. IX, 12 (Fox).
- T. *minimus* Fox. Camden Co. VII (Fox).
- T. *terminatus* Smith. DaCosta VII, 28, Iona VI, 2, Belleplain IX, 8 (Dke); Anglesea IX, 4 (Sm).
- T. *quebecensis* Prov. New Jersey VIII, 24, 31 (U S N M).
- T. *acutus* Patt. N. Woodbury VI, 13, 22, VIII, 1 (Vk).
- T. *tenuipunctus* Fox. Clementon V, 14 (Vk); VI, 6 (W. S. Huntington).
- T. *obscurus* Cress. Gloucester Co. VII, 15 (Coll).
- T. *similis* Rohw. Anglesea VIII, 4 (Coll); type locality.

TACHYTES Panz.

- T. *aurulentus* Fab. G. d. south of Piedmont Plain VII, VIII, not rare.
- T. *distinctus* Smith. (*crassus* Patt.) Westville VIII, 1 (Vk).

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- T. harpax* Patt. Essex Co., Lahaway, Ocean Co. (Coll); Camden Co. (Fox).
T. mandibularis Patt. G. d. south of Piedmont Plain VI-VIII.
T. calcaratus Fox. With the preceding VI-IX, not rare.
T. parvus Fox. Camden Co. VIII (Fox).
T. mergus Fox. Camden Co. VII (Fox).
T. pepticus Say. Ocean Co., Lakewood (Coll); Iona VII, 13 (Dke).
T. breviventris Cress. Clementon VIII, 27 (Vk).
T. elongatus Cress. Glassboro (GG).

LYRODA Say.

- L. subita* Say. Chester VIII, 12, Arlington VIII, 30 (Coll); Camden, Gloucester Cos. VIII (Fox); Westville VIII, IX (div); Lucaston IX, 3 (Dke).
L. triloba Say. Camden Co. (Fox)

Family NITELIDÆ.

MISCOPHUS Jurine.

- M. americanus* Fox. Camden Co. VII, VIII, the type locality, Gloucester Co. VII, VIII (Fox); N. Woodbury VIII, 1 (Vk).

PLENOCULUS Fox.

- P. foxi* Vier. N. Woodbury V, 22, VIII, 1, the type locality (Vk).
P. atlanticus Vier. N. Woodbury VI, 13, the type locality (Vk).
P. davisii Fox. N. Woodbury VI (Vk).

Family TRYPOXYLIDÆ.

Make cells in pithy plants, separating them by mud partitions, or make mud cells against walls, storing them with spiders. The wasps are slender, without yellow bands on abdomen.

TRYPOXYLON Latr.

- T. albopilosum* Fox. Throughout the State VI, VII, not common.
T. clavatum Say. With the preceding VII, VIII, more common.
T. carinatum Say. New Jersey (Ashm).
T. frigidum Smith. Greenwood Lake V, 30 (Coll); Trenton V, 26, VII, 10 (Hk); Lucaston VI, 13 (Dke).
T. pennsylvanicum Sauss. Camden Co. VI, 28 (Fox).
T. politum Say. Caldwell (Cr); Staten Island (Ds); New Brunswick VII (Sm); Westville (Crn); Lahaway (Coll).

T. rubrocinctum Pack. Camden VII, 10 (Vk); Westville, Gloucester Co. VII, VIII (Crn); Manumuskin VI, 21 (Dke).

T. tridentatum Pack. Recorded from New Jersey (Ashm).

T. excavatum Smith. Staten Island (Ds); New Brunswick VII (Sm).

T. bidentatum Fox. New Jersey probably.

T. albitarse Fab. Del. Water Gap VII, 7 (Jn); Prospertown VI, 1 (Coll); Clementon VII, 27 (Vk); Iona VII, 13, Manumuskin VIII, 17 (Dke).

T. johnsoni Fox. Boonton VII (GG); Riverton VII, 15 (Jn), the type locality.

T. projectum Fox. Riverton VIII, 13 (Jn); the type locality.

Super-family APOIDEA.

This series contains all the bees, social and solitary, long and short-tongued. The adults are more or less hairy, the hair is plumose, feathered, twisted or branched; sometimes dense, sometimes very sparse,

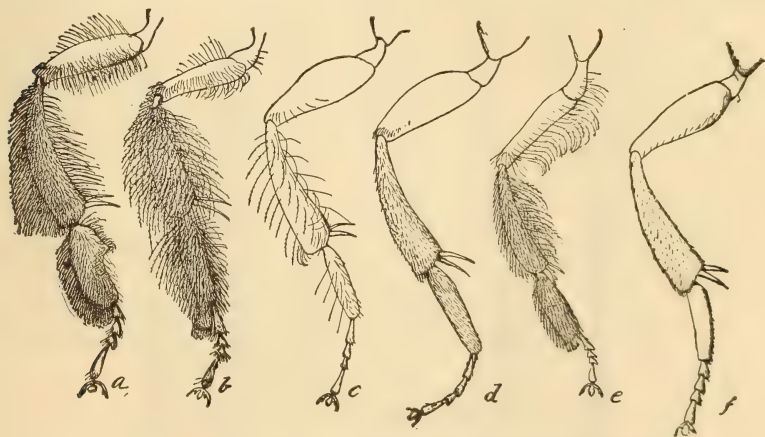


Fig. 286.—Hind legs of bees, showing the pollen baskets and combs.

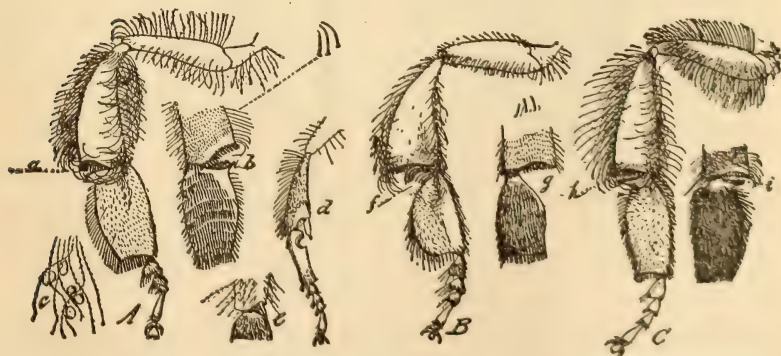


Fig. 287.—Legs of bees, showing pollen gathering structures; *a*, the honey bee; *b*, *Melipona*; *c*, bumble bee.

sometimes evenly distributed, sometimes massed at one point; but almost always compound hair indicates a member of this super-family. The tongue, besides varying from short to long, may be hinged or straight when at rest, but is always formed for lapping. The hind legs are often modified in the females and workers to serve as pollen carriers, and sometimes the underside of the breast or of the abdomen is modified to serve the same purpose.

The larvæ are apparently legless grubs that live upon pollen or honey or a mixture of the two. Sometimes this is fed as needed as in the hive bee, more usually it is stored in a cell in quantity sufficient to bring the larva from the egg laid in the same cell to maturity.

The bees, on the whole, are decidedly useful, serving as pollenizers to fruits and flowers, some of the former and many of the latter being completely dependent upon insect aid for their continued existence. Social bees are those in which workers are developed, and of these we have very few; solitary bees are those in which only males and females exist.

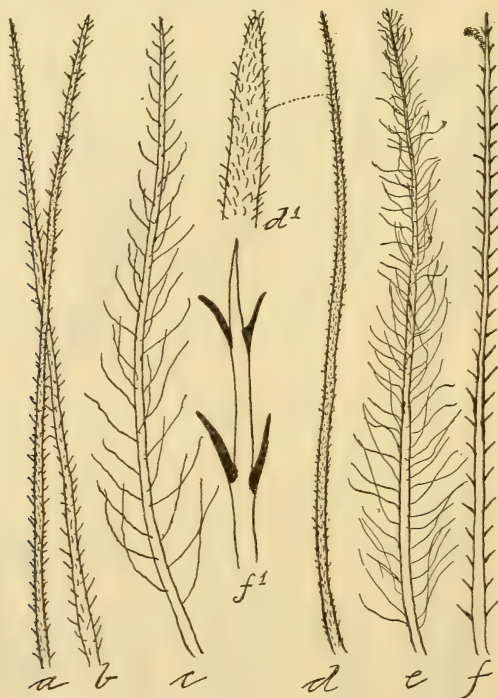


Fig. 288.—Types of compound hairs found in bees.

Family HALICTIDÆ.

These are solitary bees in so far as there are no developed workers, but they may occur in colonies, a large number of specimens building in the same territory. They are usually small in size, have short tongues,

and their nesting habits are diverse. Some of them are brilliantly blue and green in color.

HALICTUS Latr.

- H. ligatus* Say. (♂ *ornatipes* Cress., *armaticeps* Cress., *captiosus* Sm.) Throughout the State, everywhere common V–VIII.
H. confusus Smith. New Brunswick VII, 20, Jamesburg VII, 15 (Coll); Camden X, 20 (U S M).
H. parallelus Say. South Jersey (Fox).
H. provancheri D. T. (*fasciatus* Nyl., *flavipes* Fab.) Throughout the State IV, V, VII–X, not rare.

EVYLÆUS Rob.

- H. pectoralis* Smith. Middlesex Co. VII, Lakehurst VII (Coll); Camden V (U S M).
H. nelumbonis Rob. Jamesburg VII, 18, Lahaway VI, 28 (Coll); Camden VII, IX (Fox).
H. arcuatus Rob. Clementon IV, 27 (Dke).
H. truncatus Rob. Chester, Newark V (Coll).
H. quadrimaculatus Rob. Lahaway VII, 12 (Coll).
H. pectinatus Rob. Chester (Coll).

LASIOGLOSSUM Curtis.

- H. fuscipennis* Smith. Staten Island VI (Ds); Philadelphia VIII, 29 (Fox).
H. similis Smith. Burlington Co. V, Lahaway X, 14 (Coll).
H. coriaceus Smith. Staten Island IV (Ds); Prospertown VI, 1 (Coll).

CHLORALICTUS Rob.

- H. albipennis* Rob. New Brunswick VII, 20 (Coll).
H. imitatus Smith. Will probably be found in New Jersey (Ashm).
H. pilosus Smith. Throughout the State V, VI, X (div).
H. inconspicuus Smith. Newark V, Jamesburg VII (Coll); Staten Island VII (Ds); Iona VI, Manumuskin IV, 28 (Dke).
H. nymphalis Smith. Camden X, 20 (Fox); Prospertown, Ocean Co. VI (Sm).
H. nymphæarum Rob. (*palustris* Rob.) Throughout the State IV–VII.
H. zephyrus Smith. Newark V, New Brunswick IV, Atlantic Co. V (Coll); Riverton IV, 5 (Dke); So. Jersey (Fox).
H. lævissimus Smith. Staten Island IX (Ds); New Brunswick V, Jamesburg VII (Coll).
H. vierecki Craw. Throughout the Delaware Valley region IV–VIII; also Manumuskin VI, 23 (Dke). Type from New Jersey.

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- H. disparilis* Cress. Sandy Hook VIII, Jamesburg (Coll).
H. virginicus Ashm. Jamesburg (Coll). A mss. name.
H. marinus Craw. Ocean City VI, 19 (Vt).
H. sparsus Rob. Hopatcong VII, Chester VII, IX, New Brunswick VII, Burlington Co. V (Coll).
H. versatus Rob. Lake Hopatcong VII, 6 (Coll).
H. cæruleus Rob. Riverton IV, Westville IV (GG); National Park V (Dke).
H. illinoisensis Rob. Lahaway IV, 20 (Coll).
H. obscurus Rob. Lahaway IV, 20 (Coll).
H. smilacinæ Rob. Anglesea VII, 12 (Coll).

AUGOCHLORA Smith.

- H. auratus* Smith. Staten Island IV, V (Ds); Ocean Grove V, Camden Co. VIII (Fox); Jamesburg, Prospertown VI, Anglesea VII (Coll).
H. fervidus Smith. Should occur in New Jersey (Ashm).
H. humeralis Patton. Lahaway, common; has formed a great colony at this point, the soil in spots being literally honeycombed with burrows (Sm).
H. viridissimus Vier. (*viridula* Smith.) Newark VII, Orange Mts. VIII, Clementon V, Lakenurst VII (Coll); Brown's Mills V, Lucaston X, Iona VIII, Manumuskin VIII (Dke).
H. cupreus Smith. Newark V, Jamesburg VIII (Coll); Camden Co. VIII (Fox).
H. sumptuosus Sm. New Jersey (U S N M).

OXYSTOGLOSSA Sm.

- H. purus* Say. Newark V, New Brunswick X, Riverton V, Lahaway VI, VII (Coll); Riverton V, Merchantville VII (Dke).
H. persimilis Vier. (*similis* Rob.) Orange Mts. (Coll).

AGAPOSTEMON Smith.

- H. radiatus* Say. (*pulchra* Smith.) Throughout the State V-VII; common.
H. splendens Lep. DaCosta V, VII, Penbryn VII, Avalon VII (Dke); Anglesea V, VI (Coll).
H. texanus Cress. Fort Lee VIII, 30 (Dke).
H. æruginosus Smith. Camden, Gloucester Co. VIII (Fox).
H. virescens Fab. (*nigricornis* Fab.) Chester VIII, Newark IX, Monmouth Co. VIII (Coll); Caldwell (Cr).
H. lerouxii Lep. (*parellelus* Say.) Chester VII, New Brunswick VII (Coll); Clementon IV (Dke).
H. emarginata Say. Anglesea VII, 12 (Coll).
H. pilosus Cress. Woodbury VI, Iona IV, Brown's Mills V, Manumuskin V (Dke).

SPHECODES Latr.

- S. arvensis* Patt. Camden Co. V, Gloucester Co. VII (Fox); Riverton VIII, Jamesburg V, Lahaway IV, VI, South Jersey VII (Coll).
S. dichrous Smith. Caldwell (Cr); Staten Island VII (Ds); Camden Co. V (Fox).
S. clematidis Rob. Riverton VI, 11, Clementon V, 12 (Coll); National Park VI, 10 (Dke).
S. prosphorus Lovell. Lucaston VIII, 19 (Dke).
S. confertus Say. (*falcifer* Patt.) Prospertown VII, 11 (Sm); New Jersey (U S M).
S. stygica Rob. Laurel Springs VII, 21 (Dke).
S. mandibularis Cress. Camden Co. VI, 15 (Fox).
S. ranunculi Rob. Clementon V, 30 (Vk).

Family ANDRENIDÆ.

These are species of moderate or rather large size, all of them solitary, most of them diggers, and the majority with short tongues. Some of them make burrows of considerable extent, and occasionally there are large colonies in an area particularly adapted to their needs.

ANDRENA Fab.

- A. carlini* Ckll. (*bicolor* Fab.) Newark V, Trenton V, Jamesburg V, Lahaway V, VI (Coll); Great Notch V, Merchantville V, Manumuskin V (Dke).
A. erigeniæ Rob. Newark, Jamesburg, Burlington, Atlantic Co. V (Coll).
A. hirticincta Prov. (*americana* D. T.) Chester IX, Plainfield IX (Coll); Staten Island VIII, IX (Ds).
A. flavoclypeata Smith. Chester IV, Newark V, Jamesburg V (Coll); Trenton IV, 29 (Hk); DaCosta V, 18, Brown's Mills V, 21 (Dke).
A. fragilis Smith. Lake Hopatcong VII, 6 (Coll); Trenton VII, 5 (Hk).
A. hilaris Smith. Trenton VII, Glassboro V (Hk); visits flowers of raspberry (Vk).
A. integra Smith. Manumuskin (Dke).
A. nuda Rob. Jamesburg, Prospertown, Lahaway VI (Coll).
A. perplexa Smith. Glassboro V, 19 (Hk).
A. placida Smith. Jamesburg V (Coll); Trenton IV, 29 (Dke).
A. pruni Rob. Burlington Co. V (Sm).
A. nubecula Smith. Trenton IX, 2 (Hk).
A. claytoniæ Rob. Chester IV, Newark V, New Brunswick IV, Jamesburg V (Coll); Clementon V (div).
A. bisalicis Vier. (*salicis* Rob.) New Jersey (Sm).
A. vicina Smith. Throughout the State in May, local.

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- A. erythrogastra* Ashm. Camden County (Fox).
- A. nasoni* Rob. Newark, Jamesburg, Burlington Co., all V (Coll).
- A. cressoni* Rob. Newark, Burlington Co., Lahaway; all V (Coll); Manumuskine IV, 20 (Dke).
- A. hippotes* Ckll. Newark V (Coll); Westville V, 8 (Vk).
- A. alienoides* Vier. Clementon VI, 2 (Vk); Laurel Springs V, 23 (Dke).
- A. fulvipennis* Smith. Lucaston IX (div); Clementon IV, 7 (Vk); Manumuskine IX, 15 (Dke).
- A. forbesii* Rob. Orange V (Davis); Trenton IV, 26 (Coll); Riverton V, Westville V, Clementon V, VI (Vk).
- A. spireana* Rob. Iona VI, 8 (Dke); V, 16 (Hk).
- A. rugosa* Rob. Newark V (Coll); Clementon V, 16 (Vk).
- A. dæckii* Vier. Clementon V, 6-17 (div); Brown's Mills V, 13, (Dke).
- A. robertsonii* D. T. Trenton VII, 5 (Hk).
- A. arabis* Rob. Trenton V, 21 (Hk).
- A. solidaginis* Rob. Trenton IX, 2, Clementon X, 4 (Hk).
- A. andreoides* Cress. Clementon V, 3 (Hk).
- A. thaspis* Græn. Clementon V, 3 (Hk).
- A. rehni* Vier. Clementon VII, 4 (Hk).
- A. tridens* Smith. Milltown IV, 22 (Coll).
- A. bradleyi* Vier. Clementon V, 6 (Hk).
- A. winkleyi* Vier. Newark V (Coll).
- A. canadensis* D. T. Monmouth Co. X, 1 (Coll).
- A. bridewellii* Ckll. Glassboro V, 19 (Hk).
- A. imitatrix* Cress. Trenton IV, 26 (Coll).
- A. asteris* Rob. Chester IX, 16, Monmouth Co. X, 1 (Coll); Iona IX, 16 (Hk).
- A. cratægi* Rob. Trenton VII, 5, Glassboro V, 19 (Hk).
- A. mandibularis* Rob. Metuchen V, 15 (Coll).
- A. delawarearum* Vier. Clementon V, 3, (Hk).
- A. viburnella* Græn. Burlington Co. V (Coll).
- A. cockerelli* Græn. Chester IV, 4, 20 (Coll).
- A. mariæ* var. *concolor* Rob. Newark V (Coll).
- A. dunningi* Ckll. Newark V (Coll).
- A. miserabilis* Cress. Clementon V, 5 (GG).
- A. milwaukiensis* Græn. Staten Island IV (Ds).
- A. ovalis* Ashm. New Jersey (Ashm); a mss. name.
- A. tuberculata* Ashm. New Jersey (Ashm); a mss. name.

MELITTA Kirby.

- M. americana* Smith. Should occur in New Jersey (Ashm).

Family DUFOUREIDÆ.

HALICTOIDES Nyl.

- H. novæangliæ* Rob. Visits flowers of pickerel weed, "*Pontederia cordata*," and certain to be found in New Jersey.

Family MACROPIDÆ.

MACROPIS Panz.

- M. ciliata* Patt. Linden VI, 16 (Coll); visits flowers of "*Lysimachia*," "*Aralia*," "*Kalmia*" and "*Solidago*."
M. patellata Patt. Camden Co. VI, 28-VIII, 12 (Fox); visits flowers of "*Cicuta maculata*," "*Rhus glabra*" and "*Sterionema ciliata*."

Family PANURGIDÆ.

PERDITA Smith.

- P. octomaculata* Say. (*Cockerellia*) Camden Co. (Fox); Westville (Crn); Clementon IX, 4 (CG); on flowers of golden-rod and aster.
P. bradleyi Vier. Clementon V, 24 (Bradley); the type locality.
P. monardæ Vier. Riverton VIII, 11 (Vk); the type locality; on flowers of "*Monarda punctata*" (Vk).

PANURGINUS Nyl.

- P. asteris* Rob. Chester IX, 14, Riverton IX, 11 (Coll); Westville IX, 22 (Vk).
P. pauper Cress. Should occur in New Jersey.

CALLIOPSIS Smith.

- C. tricolor* Ckll. (*Panurginus*) Gloucester Co. VIII, 16 (Fox); Pemberton IX, 1 (GG); Winslow VIII, 24, Brown's Mills IX, 5 (Dke).
C. andreniformis Smith. Canada to Virginia (Ashm).

PROTANDRENA Ckll.

- P. cockerelli* Dunning. Camden Co. (Fox).

Family NOMADIDÆ.

These are rather small, not very hairy bees, somewhat resembling wasps in appearance. They are parasites or guests in the nests of other bees.

NOMADA Fab.

- N. articulata* Smith. Staten Island (Ds); Camden Co. V, 18 (Fox).
N. bisignata Say. Caldwell (Cr); Orange Mts., Burlington Co. V, Lahaway IV, 20, Prospertown VI, 1 (Coll).
N. lepida Cress. Camden Co. IV, 20 (Fox).
N. modesta Cress. Westville (Fox); Merchantville V, 25, Belleplain IX, 16 (Dke); Gloucester Co. VIII, 16, Sea Isle City VII, 22 (Jn).
N. pygmæa Cress. Camden Co. IV, 20 (Fox).
N. festiva Cress. Described from New Jersey; Jamesburg (Coll).
N. cressoni Rob. Great Notch V, 6 (Dke).
N. simplex Rob. Hainesport V, 7 (Dke).
N. denticulata Rob. Great Notch V, 6 (Dke); Jamesburg V, 16 (Coll).
N. illinoiensis Rob. Burlington Co. V (Coll).
N. sphærogaster Ckll. Chester IV, 12, 20 (Coll).

GNATHIAS Rob.

- N. cuneatus* Rob. Riverton V, 4, National Park V, 6, Wenonah VI, 14 (Dke).
N. ovata Rob. Chester (Coll).
N. americanus Kirby. Manumuskin V, 21 (Dke).

XANTHIDIUM Rob.

- N. luteola* Lep. Jamesburg IV, 8, 18 (Coll); New Jersey (Crn).
N. dentariæ Rob. Prospertown VI, 1 (Coll).
N. incerta Cress. Burlington Co. V (Coll); Westville IV, 19 (Jn); New Jersey (Crn).

HOLONOMADA Rob.

- N. affabilis* Cress. Malaga VI, 1 (Dke); Prospertown VI, 1 (Coll).
N. vincta Say. New Jersey (Cress Coll).

TRIEPEOLUS Rob.

- T. concavus* Cress. (*Epeolus*) Newark, Ocean Co. (Sm); Gloucester Co. VII, 15 (Fox).
T. donatus Smith. (*Epeolus*) Westville (Cress, Fox).
T. lunatus Say. Newark, Ocean Co. (Coll); Westville (Crn); Merchantville VIII, 19 (Jn); So. Jersey (Fox).
T. mercatus Fab. Belleplain IX, 8 (Dke). Mr. Viereck suggests that this may be the same as "*Nomada cressoni*" Rob.
T. remigatus Fab. Westville (Crn); DaCosta VII, 28 (Dke).
R. pectoralis Rob. Trenton VII, 3 (Hk).



Fig. 289.—A plate of bees, etc.: a, *Melissodes bimaculata*; b, *Andrena vicina*; c, *Celioxys 8-dentata*; d, *Halictus ligatus*; e, *Tetralonia atriventris*; f, *Osmia rustica*; g, *Andrena erigenia*; h, *Melissodes nigripes*; i, *Megachila mendica*; k, *Xenoglossa pruinosa*; l, *Tachytes mandibularis*; m, *Megachila latimanus*; more than twice natural size.

EPEOLUS Latr.

- E. bifasciatus* Cress. (*Pyrrhomelecta fumipennis* Say.) Westville, Gloucester Co. VII, 15 (Fox).
E. pusillus Cress. Westville (Fox); Lucaston IX, 14 (Dke).
E. autumnalis Rob. Chester IX, 16 (Coll).
E. scutellaris Say. Lakehurst VII, 18, VIII, 23 (Coll).

Family EUCERIDÆ.

Long tongued solitary bees of moderate size, resembling honey bees in general appearance and often with dense vestiture.

MELISSODES Latr.

- M. bimaculata* Lep. Staten Island (Ds); New Brunswick VII, Jamesburg (Sm); Westville VIII (div); Riverton VIII, Merchantville VII (Vk); Collingswood VII (GG); Winslow VIII (Dke).
M. communis Cress. Gloucester Co. VII, 15 (Coll).
M. compta Cress. Westville (Crn); Philadelphia VII, 23 (Fox).
M. dentiventris Smith. Gloucester Co. VIII, 10 (Fox); DaCosta VII, 30, VIII, 3 (Dke).
M. desponsa Smith. Orange Mts. (Coll); Lucaston IX, 9 (Dke); Clementon X, 4 (Hk).
M. nigripes Smith. Newark V, New Brunswick V, Jamesburg V, VI, Lahaway VI, Prospertown VI (Sm); Riverton, Westville (Jn).
M. obliqua Say. Camden Co. (Fox).
M. olivacea Cress. Camden Co. (Fox).
M. pennsylvanica Lep. New Jersey (Bt).
M. perplexa Cress. Newark (Sm); Riverton VIII, 17, Manumuskin VIII, 17, Belleplain IX, 9 (Dke).
M. rustica Say. Newark (Sm); Trenton IX, 26 (Hk); Westville (Crn); Mr. Viereck suggests that this may be the same as "simillima" Rob.
M. fimbriata Cress. Cape May VI, 14 (Fox).
M. atripes Cress. Camden Co. (Fox).
M. caliginosa Cress. Gloucester Co. IX, 5 (Fox).
M. atrifrons Sm. Camden Co. (Fox).
M. menuacha Cress. Camden Co. (Fox).
M. trinodis Rob. Chester IX, 10 (Coll).

TETRALONIA Spin.

- T. atriventris* Smith. (*Synhalonia*) New Brunswick Jamesburg V, 7 (Sm); Clementon V, 12 (Jn).

XENOGLOSSA Smith.

- X. pruinosa** Say. Throughout the State VII-IX; visits flowers of cucurbits by preference and is one of the most effective agents in their pollination. The bees often spend the night in the closed flowers.

Family EMPHORIDÆ.

MELITOMA Latr. (**ENTECHNIA** Patton.)

- M. taurea** Say. Ft. Lee rare (Bt); Camden Co. VI, 3 (Fox).

EMPHOR Patton.

- E. bombiformis** Cress. Arlington VIII, 30, digging shallow burrows in soil (Gr); Gloucester Co. VIII, 16 (Fox); visits flowers of "Ipomea" (Ckll), and of marshmallows (Gr).

Family ANTHOPHORIDÆ.

ANTHOPHORA Latr.

- A. abrupta** Say. Caldwell (Cr); Palisades VII, 3 (Dke).
A. bomboidea Kirby. Pennsylvania (Ashm) and sure to occur in New Jersey.
A. floridana Smith. Orange Mts., Jamesburg V, 4, Lahaway VI, 2 (Coll); Clementon IV, V (div); Manumuskin IV, 11 (Dke).
A. terminalis Cress. Riverton IX, 9 (Hk).

Family PROSOPIDÆ.

PROSOPIS Fab.

- P. affinis** Smith. Caldwell (Cr); New Brunswick VII, 24, Jamesburg VII, 15 (Coll).
P. modesta Say. Jamesburg VII, 15 (Coll); Camden Co. VI, 18 (Fox).
 This and the preceding are probably the same (Vk).
P. antennata Cress. Recorded from New Jersey only.
P. confluens Ckll. Camden Co. (Ckll).
P. pygmæa Ckll. Jamesburg V, VI, Lakehurst VII (Coll); Camden Co. (Fox).
P. sparsa Cress. New Jersey probably (Ashm).
P. verticalis Cress. New Jersey probably (Ashm).
P. ziziæ Rob. Jamesburg V, 31 (Coll); Ocean Grove (Ckll).
P. sayi Rob. Orange Mts. VIII, 29, New Brunswick V, Jamesburg V (Coll).

Family COLLETIDÆ.

Moderate sized, long-tongued, hairy bees, burrowing in sandy places.

COLLETES Latr.

- C. armatus* Patt. New Jersey (Ashm); Lucaston IX, 9 (Hk); visits flowers of "Compositæ" (Vk).
C. americanus Cress. Camden Co. VII, 3 (Fox); Clementon X, 4 (Hk); Manumuskin IX, 15 (Dke); Anglesea IX, 3 (Coll).
C. compactus Cress. Chester (Dn); Lahaway III-V (Sm); Clementon IX, 5 (Hk); Lucaston, DaCosta, Manumuskin, all V (Dke).
C. inæqualis Say. (*propinqua* Cress.) Camden Co., Atco (Fox); Chester IV, 20, Lahaway III, 26-IV, 20 (Coll); Clementon IV, V (div); Manumuskin IV, V (Dke).
C. inæqualis ferrugineus Swenk. Hainesport III, 26 (Dke); Riverton (Vk).
C. validus Cress. Staten Island IV (Ds); New Brunswick, Jamesburg IV (Coll); Camden Co. V, 18 (Fox); Riverton IV, 3 (Dke); Clementon V, 3 (Hk).
C. brevicornis Rob. North Woodbury (Vk).
C. nudus Rob. Anglesea VIII, 8, on white umbellifer (Vk).
C. rufithorax Swenk. Westville VI, Clementon V, VI, Manumuskin V, Ocean City VI, Avalon VI, Anglesea V (Swenk); Prospertown VI (Coll).
C. thoracicus Smith. Clementon VI, 6 (Hk); Brown's Mills V, 21, Cape May VI, 7, large numbers on blossoms of holly (Dke).

Family STELIDIDÆ.

STELIS Panz.

- S. fœderalis* Smith. (*Melanostelis nitida* Cress.) New Jersey probably (Ashm).
S. lateralis Cress. (*Protostelis*) Camden Co. V, 18 (Fox).
S. australis Cress. Wenonah VII, 22 (Haim).
S. foxi Ashm. (*Melanostelis*) Camden Co. VII, 12 (Fox); a mss. name and probably the same as "australis" Cress.

Family MEGACHILIDÆ.

MEGACHILE Latr.

These are leaf-cutter bees that make their nests in burrows, forming cells of semi-circular pieces of leaves. They are solitary, and the pollen carrying structures are on the under side of the abdomen.

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- M. addenda* Cress. (*manumuskin* Vier.) Clementon VI, 5, DaCosta VII, Iona VI, 16, Manumuskin VI, 24 (Dke); the type locality is in New Jersey.
- M. brevis* Say. Caldwell (Cr); Staten Island (Ds); New Brunswick VII, Jamesburg V, Ocean Co. (Coll); Camden, Gloucester Co. VII, VIII (Fox); DaCosta VII (Dke).
- M. exilis* Cress. (*studiosa* Cress.) New Jersey (Cress); Trenton VII, 11 (Hk).
- M. vidua* Smith. (*frigida* Sm.) Camden Co. VII, Gloucester VIII (Fox); Westville (Crn).
- M. generosa* Cress. Iona VIII, 25 (Dke).
- M. mendica* Cress. Throughout the State VI-X, common.
- M. mucida* Cress. New Brunswick (Sm).
- M. optiva* Cress. Gloucester Co. VIII, 10 (Fox).
- M. perbrevis* Cress. New Jersey (Cress); Philadelphia IX, 5 (Fox).
- M. petulans* Cress. Philadelphia VII, 25 (Fox).
- M. pruina* Smith. Lahaway VI, 9, Anglesea VIII, 4 (Coll); New Jersey (Ashm).
- M. gemula* Cress. Philadelphia VII, 10 (Fox).

SAYAPIS Titus.

- M. pugnata* Say. Camden Co. IX, 7 (Fox); New Jersey (Cress Coll).

CYPHOPYGA Rob.

- M. montivaga* Cress. Should occur in New Jersey (Ashm).

XANTHOSARUS Rob.

- M. latimanus* Say. (*femorata* Sm.) Throughout the State VIII-X.
- M. melanophæa* Smith. Westville (Crn).
- M. infragilis* Cress. New Brunswick VII, 21 (Coll).

GNATHODON Rob.

- M. georgica* Cress. DaCosta VII, 16 (Dke).

CÆLIOXYS Latr.

The species of this genus are parasitic in the cells of "Megachile" and were referred to the family "Stelididæ" in the last edition.

- C. alternata* Say. Should occur in New Jersey (Ashm).
- C. dubitata* Smith. (*rufitarsis* Sm.) Riverton IX, 9 (Hk); Gloucester Co. IX, 21 (Fox).

- C. modesta* Smith. Philadelphia VIII, 17 (Fox); Pemberton IX, 1 (Hk); not common.
- C. 8-dentata* Say. Throughout the State VII, VIII.
- C. sayi* Rob. Trenton VII, 5 (Hk); New Jersey (Ash).

OSMIA Panz.

These are large-headed, chunky bees, usually blue or green in color, somewhat metallic.

- O. atriventris* Cress. Riverton V, 4, Iona VI, 2 (Dke); Lahaway V, 3 (Coll).
- O. rustica* Cress. (*Nothosmia*) Camden Co. (Fox).
- O. chalybea* Smith. New Brunswick IV, V (Sm); Laurel Springs V, VI (Dke).
- O. simillima* Smith. (*cognata* Cress.) Caldwell (Cr); Monmouth Co. V, 28 (Fox).
- O. vicina* Cress. Philadelphia V, 28 (Fox).
- O. lignaria* Say. (*Ceratostmia*) Caldwell (Cr); Lahaway VI, 7, 28 (Coll).
- O. distincta* Cress. (*Nothosmia*) Camden Co., Philadelphia V, 12 (Fox).
- O. albiventris* Cress. Caldwell (Cr); New Jersey (Crn).

ANDRONICUS Cress.

- A. producta* Cress. (*Alcidamea*) Caldwell (Cr); New Brunswick VII, 21, Jamesburg VII, 14, Lahaway VI, 1 (Coll); Westville (Fox).

HERIADES Spin.

- H. carinatum* Cress. (*Trypetes*) Camden Co. VII, 12 (Fox); New Jersey (Cress).
- H. variolosum* Cress. Should occur in New Jersey (Ashm).

DIANTHIDIUM Ckll.

- D. notatum* Latr. (*Anthidium*) Riverton IX, 2, Pemberton IX, 8 (GG); Penbryn VIII, 2, Manumuskin VII, 5 (Dke).
- D. simile* Cress. Bamber VII, 13, Lacy VII, 14 (Dke).

Family CERATINIDÆ.

CERATINA Latr.

- C. dupla* Say. Throughout the State IV, V; a little, naked, blue-green species, makes cells in the pith of briars, etc., storing with thick honey.

Family XYLOCOPIDÆ.

XYLOCOPA Latr.

- X. virginica** Dru. The large carpenter bee; common throughout the State V, VI, making holes half an inch in diameter in boards or beams about porches, sheds, etc. Cells made of leaf cuttings.

Family APIDÆ.

This contains the true bees, most of them social, with workers or undeveloped females in the colonies, and most of them storing honey to a greater or less extent.

PSITHRUS Lepel. (APATHUS Newn.)

The species of this genus resemble the bumble bees, but are really parasitic, in so far as they develop as unbidden guests in the nests of the Bombi. The females have no pollen-baskets; the males are not easily distinguished from bumble bees.

- P. ashtoni** Cress. Caldwell (Cr).
P. laboriosus Fab. (*citrinus* Sm.) Caldwell (Cr).
P. variabilis Cress. Jamesburg VII, 18 (Coll).
P. elatus Fab. Jamesburg, Monmouth Co. X, 1, Anglesea (Coll).

BOMBUS Latr.

These are the "bumble bees." They are social, make their nests in cavities in the ground, the female winters and breeds workers only in early summer. They have a very long tongue, and are the almost exclusive agents in fertilizing red clover.

- B. pennsylvanicus** DeG. (*americanorum* Fab.) Throughout the State all season.
B. affinis Cress. Greenwood Lake (Cr); Westville (Fox).
B. bimaculatus Cress. Philadelphia VII, 23 (Fox).
B. borealis Kirby. New Jersey (Ashm).
B. consimilis Cress. Throughout the State IV-IX.
B. fervidus Fab. Throughout the State V-IX.
B. ridingsi Cress. Throughout the State IV-VIII.
B. ternarius Say. Staten Island VIII (Ds).
B. vagans Smith. Throughout the State VII-IX.
B. impatiens Harr. (*virginicus* Oliv.) Throughout the State all season.
B. perplexus Cress. Brown's Mills VI, 27 (Dke).

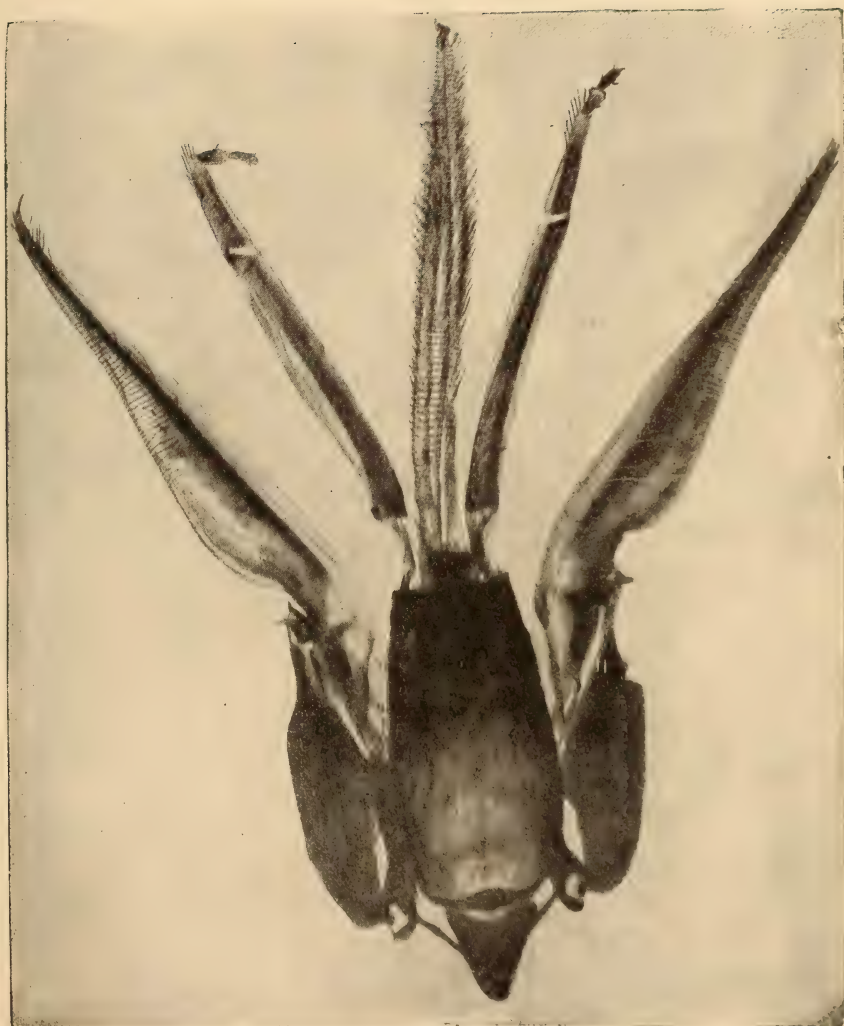


Fig. 290.—Tongue of a bumble bee.

BOMBIAS Rob.

- B. separatus** Cress. Caldwell (Cr); Staten Island (Ds); Westville (Fox).
B. auricomus Rob. Caldwell (Cr); Westville (Fox).
B. scutellaris Cress. Lucaston IX, 17, Brown's Mills IX, 9 (Dke); Anglesea VIII, 8 (Vk).

APIS Linn.

- A. mellifera** Linn. (*mellifica*) The common or domesticated honey bee, found throughout the State all season.



Fig. 291.—Honey bee worker, *Apis mellifera*.

Order SIPHONAPTERA.

Contains the fleas which are considered as flies, modified to suit a parasitic mode of life. They are usually brown in color, transversely flattened, the edges of the segments set with stiff spines directed backward, and the hind legs enormously developed for leaping. They drop their eggs in the sleeping quarters of their host, and from these come slender, white, worm-like larvæ. These feed on refuse animal or vegetable debris and the pupæ hide in crevices, or in houses between the boards of floors.

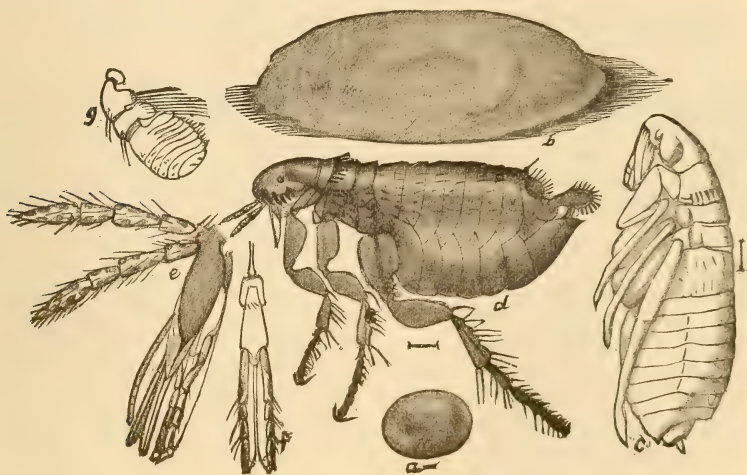


Fig. 292.—The dog flea, *Ctenocephalus canis*: a, egg; b, larva in cocoon; c, pupa; d, adult; e, f, g, details of mouth and antennal structure; all enlarged.

Sometimes a house becomes overrun with fleas, and in such cases the sleeping place of the dog or cat must first be thoroughly cleaned, so as to destroy the source of the trouble. All the adult fleas will get upon the dog or cat at the first opportunity, and these pets, therefore, can be used as traps, then washed with carbolic soap at short intervals until all the fleas have been captured and destroyed. A free use of gasoline in the crevices of the floor will kill all larvæ and pupæ that may be there, and will at once check breeding.

No systematic collections have been made in New Jersey. I have taken fleas from moles, rabbits, muskrats, and have seen them in quantities in nests of field mice. They also occur on rats and on almost every other hairy animal in the State, but no effort has yet been made to determine the species.

Those listed here occur practically everywhere. The names are from the list published by C. F. Baker in 1904, and it is remarkable that at that

time the author had practically no material from the middle Atlantic States.

Family PULICIDÆ.

PULEX Linn.

P. irritans Linn. The human flea. Not a native of New Jersey, but is almost cosmopolitan, and specimens are occasionally found, brought from more southern States.

CTENOCEPHALUS Kol.

C. canis Curt. (*Pulex serratriceps*) The common cat and dog flea.

CERATOPHYLLUS Curtis.

C. wickhami Baker. (*Pulex howardi*) One of the squirrel fleas.

CTENOPHTHALMUS Kol.

C. pseudarytes Baker. A parasite on field mice.

Order DIPTERA.

This order contains the flies, always recognizable by having two wings only, the secondaries being reduced to little knobs or halteres. The head is separated from the thorax by a distinct, very narrow neck, and the antennæ are either quite long or very short, often aristate. The mouth parts are formed for scraping or sucking, or both, and never for chewing, in the adult stage. The larvæ vary greatly, but are usually either very slender and elongate, or maggot-like in form. The metamorphosis is complete, and the change from larva to adult is more radical than in any other order.

Since the publication of the previous list our knowledge of the "Diptera" has increased vastly, and collectors are more numerous than ever before. Mr. Charles W. Johnson, now Curator of the Boston Society of Natural History, has again prepared the list as a whole, and has added perhaps the greatest number of species to it. But in the "Cecidomyiidae" Mr. William Beutenmuller has done this work, and while the list in that family is still far from complete, it is a much better picture of our fauna than was the previous one. In the "Culicidae" the list is probably almost complete. In no other family have collections been so thorough and systematic, and it is believed that few species will be added in future. Mr. John A. Grossbeck, one of the assistants in the mosquito investigation, has written this part of the list. In the "Tabanidae" Mr. V. A. E. Daecke has supplied the mss., and here again his persistent and careful work, supplemented by that of Mr. Henry S. Harbeck, has left little to be done. In addition to these gentlemen, Messrs. G. M. Greene and Chas. T. Greene, of Philadelphia, have added many records, and nearly all the contributors to the previous edition have helped along the work on this.

Mr. Johnson estimated that the 1,200 species listed in the last edition were about two-thirds of the actual number to be found in the State. As before, all records not otherwise specifically credited belong to Mr. Johnson.

Family TIPULIDÆ.

These are the "Crane-flies," which resemble exaggerated mosquitoes in appearance, and derive the common name from their long, ungainly, slender legs. The head is often prolonged into a sort of blunt snout at the end of which are the prominent palpi, which are sometimes as long as the antennæ.

The species are most common in low meadows or at the edges of woodland, and their flight is as uncertain and awkward as their appearance. It is difficult to preserve these insects, because the legs break off at the least provocation, even when they are alive.



Fig. 293.—A crane fly, *Pachyrhina* species.

The larvæ of most of these flies are slender, cylindrical, worm-like, and very tough, whence they are known as "wire worms" in England, where they are often injurious on sod land and to root crops. This type lives in the soil, and may feed on either living or dead vegetation. A few feed on leaves and somewhat resemble caterpillars, but in no case are they injurious in New Jersey, so far as I have had any knowledge of them.

GERANOMYIA Haliday.

- G. rostrata* Say. Lenola, Clementon V, 30 (Jn); Riverton V, 19, VII, 3, IX, 11 (div), National Park VI, 3 (Dke).
G. canadensis Westw. "New Jersey" (A E S), Cape May IX, 21 (Vk).
G. diversa O. S. "New Jersey" (A E S).
G. distincta Doane. Manumuskin VI, 23 (Dke).

RHIPIDIA Meig.

- R. maculata* Meig. "New Jersey" (A E S).
R. domestica O. S. Palisades (O S); Clementon V, 16, bred from larvæ obtained in fermented sap of "Nyssa sylvatica," Riverton VI, 16.

R. fidelis O. S. Chester VIII, 9 (Coll).

R. bryanti Johns. Dover VI, 25.

TROCHOBOLA O. S.

T. argus Say. Palisades V (Lv).

DICRANOMYIA Steph.

D. rara O. S. Dover VI, 23.

D. liberta O. S. Jamesburg (Sm); Clementon VI, 3.

D. stulta O. S. "New Jersey" (A E S).

D. morioides O. S. "New Jersey" (A E S).

D. pubipennis O. S. "New Jersey" (Bt).

D. simulans Wlk. (*defuncta* O. S.) Caldwell VI, 8 (Cr).

D. hæretica O. S. Caldwell (Cr); Jamesburg (Sm).

D. badia Walk. Forest Hill X (Wdt).

D. immodesta O. S. Forest Hill IX (Wdt); Lucaston IX, 28, X, 15 (Dke).

D. gladiator O. S. Avon IX, 27 (Hk).

LIMNOBIA Meig.

L. immatura O. S. Boonton VII, 18 (GG); Caldwell (Cr).

L. cinctipes Say. Caldwell (Cr).

L. triocellata O. S. Dunnfield, Del. Water Gap VII, Asbury Park VIII, 16, Westville VI, 6 (Jn); Lucaston IX, 28 (Dke).

L. fallax Johns. (*solitaria* Johns, not O. S.) Dunnfield, Del. Water Gap VII, 14.

L. tristigma O. S. Dunnfield, Del. Water Gap VII, 11.

L. sociabilis O. S. Caldwell (Cr).

L. indigena O. S. Merchantville VI, 4 (Dke).

TOXORRHINA Loew.

T. magna O. S. Type "New Jersey" VII (A E S); Wildwood VIII, 12.

RHAMPHIDIA Meig.

R. flavipes Macq. Riverton VII, 31, VIII, 25, Clementon VI, 3 (Jn); National Park V, 20 (Dke).

ELEPHANTOMYIA O. S.

E. westwoodi O. S. Delaware Water Gap VII, 12.

ATARBA O. S.

A. picticornis O. S. Riverton VI, 18.

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DICRANOPTYCHA O. S.

D. germana O. S. "New Jersey" (A E S).

D. sobrina O. S. New Hope VII, 10 (Hk).

TEUCHOLABIS O. S.

T. complexa O. S. Avalon; larva in considerable number under bark VI, 8; commenced pupating in 4 or 5 days; imagoes VII, 22-27.

CLADURA O. S.

C. flavoferruginea O. S. Forest Hill IX (Wdt).

ANTOCHA O. S.

A. saxicola O. S. (*opalizans* O. S.) Dunnfield, Del. Water Gap VII, 10.

RHYPHOLOPHUS Kol.

R. innocens O. S. Westville IV, 9 (Jn); Riverton IV, 10 (Dke).

R. nubilus O. S. Newark IV (Wdt).

ERIOPTERA Meig.

E. chlorophylla O. S. Common; Riverton VI, 19, VII, 3, Westville VII, 2.

E. straminea O. S. Riverton VI, 18.

E. venusta O. S. Riverton VI, 15, Merchantville V, 26 (Dke); Woodbury VI, 7.

E. septemtrionalis O. S. Riverton VII, 3.

E. armata O. S. "New Jersey" (A E S, Bt); Orange Mts. VI.

E. chrysocoma O. S. Riverton VI, 18, Westville VII, 2.

E. caloptera Say. Boonton IX, 18 (GG); Riverton VII, 3, Avalon VII, 22.

E. dulcis O. S. Del. Water Gap VII, 13, Riverton VI, 16 (Jn).

E. parva O. S. Del. Water Gap VII, 13 (Jn); Orange VI (O S).

E. vespertina O. S. "New Jersey" (A E S).

MOLOPHILUS Curtis.

M. forcipula O. S. South Orange (O S).

M. hirtipennis O. S. Orange (O S).

M. ursinus O. S. Ashland V, 13 (Hk); Clementon V, 14 (Jn).

M. pubipennis O. S. Chester VIII, 1 (Coll); Shark River VII, 12.

GONIOMYIA O. S.

G. manca O. S. South Orange VI, 30, 1868 (O S).

G. blanda O. S. Long Branch VI, 12.

G. sulphurella O. S. Riverton V, 28, Asbury Park VIII, 16.

G. cognatella O. S. Clementon V, 12.

HELOBIA St. Farg. (SYMPLECTA Meig.)

- H. hybrida* Meig. (*punctipennis* Meig.) Riverton IX, 25, Shiloh IX, 1 (Jn); Avon IX, 27, Pemberton V, 20 (Hk).

TRIMICRA O. S.

- T. anomala* O. S. Anglesea V, 30, VII, 9 (Sm).

GNOPHOMYIA O. S.

- G. tristissima* O. S. Del. Water Gap VII, 8, Westville VI, 6 (Jn); New Hope VII, 10 (Hk).

ULOMORPHA O. S.

- U. pilosella* O. S. Shark River VII, 12.

TRICHOCERA Meig.

- T. regelationis* Linn. Caldwell V, 5 (Cr); Camden II, 21, Westville IV, 9.
T. bimacula Walk. Riverton IX, 3.
T. brumalis Fitch. Riverton IX, 3.

EPIPHRAGMA O. S.

- E. fascipennis* Say. New Hope VIII, 10 (Hk); Newark VI, 16, Riverton V, 29, Clementon VI, 3, Woodbury VI, 7.

LIMNOPHILA Macq.

- L. fuscovaria* O. S. Jamesburg VII, 4, Westville VI, 6, Clementon VIII, 9.
L. luteipennis O. S. Wenonah VI, 23 (Hk); Woodbury VI, 7, Westville VII, 2, Lenola V, 30.
L. tenuipes O. S. Riverton VII, 24.
L. macrocera Say. Westville VI, 6, Merchantville V, 26, VI, 4 (Dke).
L. adusta O. S. "New Jersey" (A E S); Westville V, 18.
L. recondita O. S. Long Branch VI, 12, Riverton VII, 24.
L. rufibasis O. S. Dover VI, 11 (Jn); Culver's Lake V, 29 (Coll); Orange Mts. V (Wdt).
L. imbecilla O. S. "New Jersey" (A E S).
L. toxoneura O. S. "New Jersey" (A E S).
L. lenta O. S. Orange Mts.
L. contempta O. S. Westville VII, 21 (Jn); Lakehurst VIII, 23 (Coll).
L. quadrata O. S. Culver's Lake V, 29 (Coll).
L. irrorata Johns. Riverton VIII, 5.

ERIOCERA Macq.

- E. fuliginosa* O. S. Orange Mts. VII, 4.
E. brachycera O. S. Dunnfield, Del. Water Gap VII, 14 (Jn); Orange Mts. VI (Wdt).

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E. wilsonii O. S. "New Jersey" (A E S).

E. longicornis Walk. Passaic VI, 8 (Coll); Trenton V, 30 (Hk).

PENTHOPTERA Schiner.

P. albitarsis O. S. Del. Water Gap VII, 11, 12, Shark River VII, 12, Clementon VIII, 7 (Jn); Trenton VII, 12 (Hk).

ÆSHNASOMA Johnson.

A. rivertonensis Johns. Riverton VII, 20, 1902.

TRICYPHONA Zett. (AMALOPIS Haliday.)

T. inconstans O. S. Del. Water Gap VII, 11, Woodbury V, 14, Westville VI, 6, Shiloh IX, 1 (Jn); Riverton V, 19, Wenonah VI, 23 (Hk); Lucaston IX, 22 (Dke).

T. vernalis O. S. Lucaston IV, 14, IX, 28 (Dke); Clementon V, 5 (Hk).

PEDICIA Latr.

P. albivitta Wlk. Dunnfield, Del. Water Gap VII, 11, 15 (Jn); Caldwell (Cr); Riverton IX, 10 (Vk).

LIAGMA O. S.

L. nodicornis O. S. "New Jersey" (A E S).

BITTACOMORPHA Westwood.

B. clavipes Fab. Caldwell (Cr); Westville V, 19, Atco VI, 18 (Jn); Riverton IV, 24, X, 9 (div); Jamesburg V, VI, along ditches, Lahaway V, 28 (Sm).

B. jonesi Johns. Clementon V, 5 (Hk).

PTYCHOPTERA Meig.

P. rufocincta O. S. Newark VI, 16, Riverton V, 30, Westville VII, 12 (Jn); Clementon VI, 7 (Li); Wenonah VI, 23 (Hk).

BRACHYPTERMNA O. S.

B. dispellens Walk. Shark River VII, 12, 1897.

OROEZA Needham. (DOLICHOPEZA Curt.)

O. albipes Johns. Del. Water Gap VII, 21, Dover VI, 17, Riverton VIII, 3.

O. subalbipes Johns. Long Branch VI, 12, Westville VI, 6, Clementon VI, 3.

O. obscura Johns. Riverton VIII, 11.

O. sayi Johns. (*T. annulata* Say not Linn.) Westville VI, 6.

XIPHURA Brullé.

- X. frontalis** O. S. Palisades V (Lv).
X. fumipennis O. S. (*Ctenophora*) Palisades VI, 6 (Lv).

CTENOPHORA Meig.

- C. nubecula** O. S. Caldwell V, 29 (Cr).

PACHYRHINA Macq.

- P. ferruginea** Fab. Common; Del. Water Gap VII, 11-15, New Brunswick, Riverton, Shiloh IX, 1 (Jn); Trenton V, 21 (Hk).
P. incurva Loew. Newark VI, 14, New Brunswick VII, 1, Westville VI, 6.
P. collaris Say. Westville IV, 9 (Jn); Lucaston IV, 10-14 (Dke).
P. virescens Loew. Del. Water Gap VII, 11, 15, Dover VI, 23, Newark VI, 14, Riverton VI, 19, Westville VII, 21.
P. tenuis Loew. Del. Water Gap VII, 10, Newark VI, 14, Westville VI, 6 (Jn); Iona V, 24 (Dke).
P. eucera Loew. Passaic VI, 8 (Coll); Ft. Lee VI, 23 (Dke); Long Branch VI, 12, DaCosta VI, 4.
P. unifasciata Loew. Dunnfield, Del. Water Gap VII, 14 (Jn); Trenton VII, 7 (Hk).
P. sodalis Loew. Orange Mts. VI, 22, Westville VI, 6 (Jn).
P. macrocera Say. Newark VI, 14, Westville VI, 27.
P. xanthostigma Loew. Riverton VII, 3.
P. punctum Loew. Del. Water Gap VII, 1, Riverton VII, 24.
P. polymera Loew. Riverton VI, 14.

STYGEROPIS Loew.

- S. fuscipennis** Loew. "Salt meadow" Newark VI (Wdt).

LONGURIO Loew.

- L. testaceus** Loew. Dunnfield, Del. Water Gap VII, 12, 15.

TIPULA Linn.

- T. abdominalis** Say. Boonton IX, 17 (GG); Morris Plains (Jn); Caldwell (Cr).
T. caloptera Loew. Del. Water Gap VII, 15, Dover VI, 17 (Jn); Ocean County (Sm); Iona V, 24 (Dke).
T. trivittata Say. Dunnfield, Del. Water Gap VII, 11, 15, Newark VI, 13 (Jn); National Park VI, 13 (Dke).
T. bella Loew. Clementon V, 10, Westville VIII, 21, Riverton IX, 11 (Jn); Wenonah VI, 23 (Hk); Anglesea IX, 12 (Dke).
T. longiventris Loew. Dover VI, 17, Newark VI, 12 (Jn); Clementon V, 30 (Hk); Manumuskin V, 10 (Dke).

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- T. fuliginosa* Say. Dover VI, 17, Newark VI, 13.
T. hebes Loew. Caldwell (Cr); Ft. Lee VIII, 30 (Dke); Westville IX, 13.
T. fasciata Loew. Del. Water Gap VII, 11, Palisades, Jamesburg VII, 4, Clementon V, 30, VIII, 11 (Jn); Passaic VI, 8 (Coll).
T. tricolor Fab. Del. Water Gap VII, 15, Jamesburg VII, 21, Clementon VIII, 11, Westville VIII (Jn); Riverton IV, 21 (Hk).
T. costalis Say. Caldwell (Cr), Princeton VII, 21, Riverton IX, 9 (Jn); Lucaston IX, 12 (Dke).
T. cunctans Say. Riverton IX, 25, X, 9.
T. speciosa Loew. Dover VII, 17, Newark VI, 13.
T. submaculata Loew. Del. Water Gap VII, 15 (Jn); Caldwell (Cr); Laurel Springs VI, 10 (Dke).
T. valida Loew. Del. Water Gap VII, 15, Dover VI, 23 (Jn); New Brunswick VI, 9 (Sm).
T. dejecta Walk. Orange Mts. (Jn); Riverton IV, 22, Lucaston IV, 10 (Dke); Clementon IV, 15, V, 5 (div).
T. tephrocephala Loew. Dunnfield, Del. Water Gap VII, 8 (Jn); Ft. Lee VII, 4, Stone Harbor VII, 29 (Dke).
T. cincta Loew. Riverton IV, 17 (Jn); National Park V, 6, Manumuskin IV, 27 (Dke).
T. strepens Loew. Newark VI, 31, Riverton V, 30.
T. flavicans Fab. Manumuskin X, 21 (Dke).
T. latipennis Loew. New Brunswick VI, 9, Ocean County (Coll).
T. perlongipes Johns. Orange Mts. V, Avalon VI, 30.
T. pallida Loew. Dover VI, 17.
T. angustipennis Loew. Culver's Lake VI, 29 (Coll).
T. jejuna Johns. Riverton VII, 20.

Family DIXIDÆ.

Small, slender mosquito-like species, wings bare, antennæ thick at base, other joints hair-like, joints indistinctly marked; larvæ aquatic. Our species are not of economic importance.

DIXA Meigen.

- D. notata* Loew. Dunnfield, Del. Water Gap VII, 11, 15.
D. terna Loew. Dunnfield, Del. Water Gap VII, 11.

Family PSYCHODIDÆ.

PSYCHODA Latr.

- P. alternata* Say. Cape May VIII, 20 (Vk); Lucaston IX, 14 (Dke); bred from water.
P. marginalis Banks. Riverton V, 14; National Park V, 6-20 (Dke).
P. minuta Banks. Riverton IX, 14. Common on trunk of the button-wood.

P. cinerea Banks. Riverton VI, 8.

P. superba Banks. Riverton VII, 29.

P. albitarsis Banks. Del. Water Gap VII, 8, 15.

Family STENOXENIDÆ.

STENOXENUS Coq.

S. johnsoni Coq. Type of the family and genus was collected at Dunnfield, Del. Water Gap VII, 11, 1908; very rare, and habits in early stages unknown.

Family CHIRONOMIDÆ.

These flies are indifferently named "gnats," "midges," sand-flies" or "punkies," the latter two names chiefly applied to the few minute forms with piercing mouth parts. They somewhat resemble mosquitoes in appearance, but have naked wings, and the thorax is produced so as to hide the small head from above. The antennæ in the male are lengthily plumose, and in the female are also furnished with lateral hair. The insects occur at all seasons, many of them in spring, and they dance in the early evening in great swarms only a few feet above ground, usually in a damp locality. The larvæ live in water on living or dead vegetation, or on sap of trees, under fallen leaves or decaying vegetable matter.

As a rule, they are harmless, except for the annoyance caused by the biting tribes, but the larva of one species at least mines the leaves of water plants, and thus becomes injurious in a very limited and special way.

CERATOPOGON Meigen.



Fig. 294.—*Ceratopogon stellifer*; much enlarged.

C. exilis Coq. Riverton X, 9.

C. fuscus Coq. Riverton IV, 30.

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- C. specularis* Coq. Riverton X, 9.
C. transiens Walk. Riverton VIII, 21 (Jn); Manahawkin IX, 5 (Hk).
C. piceus Winn. Atlantic Highlands VII, 1 (Lv); Clementon V, 16 (Jn).

CULICOIDES Latr.

- C. variipennis* Coq. Westville VI, 6.
C. cinctus Coq. Riverton X, 9.

BEZZIA Kieffer.

- B. albiventris* Loew. Riverton VI, 16.
B. elegans Coq. Riverton V, 14.
B. expolita Coq. Riverton VI, 3 (Jn); Glassboro V, 19 (Hk).
B. johnsoni Coq. Riverton VI, 3.
B. media Coq. Riverton VIII, 7.
B. pulverea Coq. Riverton VII, 3.
B. setulosa Loew. Riverton VII, 3.
B. smithii Coq. (*mundus* Coq. not Loew.) Riverton VI, 16.

JOHANNSENIELLA Will.

- J. albaria* Coq. Del. Water Gap, VII, 12, Westville VII, 12.
J. argentata Loew. Princeton VII, 21, Westville VII, 29.
J. bimaculata Loew. Riverton VI, 6, Westville VII, 21.
J. diversa Coq. Riverton VII, 7.
J. nebulosa Coq. Riverton VI, 19.
J. viridis Coq. Riverton VI, 16.

PALPOMYIA Megerle.

- P. flavipes* Meig. Del. Water Gap VIII, 8, Woodbury V, 14.
P. longipennis Loew. Westville VI, 27.
P. lineatus Meig. Westville VI, 6.
P. rufus Loew. Newark VI, 13, Westville VII, 27, Atco VI, 4 (Jn); Clementon V, 6 (Hk).
P. tibialis Meig. Woodbury VI, 7.
P. trivialis Loew. Culver's Lake V, 29 (Sm); Princeton VII, 21, Westville VI, 27, Clementon VI, 3 (Jn); Trenton VII, 5, Brown's Mills VII, 10 (Hk).

HETEROMYIA Say.

- H. fasciata* Say. Westville VI, 15, VII, 2, Camden VI, 6, Buena Vista VI, 9 (Li), Riverton VI, 16-20.
H. festiva Loew. "New Jersey" (A E S).
H. plebeja Loew. Westville VII, 21.
H. basalis Walk. Riverton VII, 12.

PROCLADIUS Skuse.

- P. scapularis** Loew. Riverton VII, 24.
P. thoracicus Loew. Riverton VI, 19, Westville VII, 21.

TANYPUS Meigen.

- T. dyari** Coq. Forest Hill (Wdt); New Brunswick IV, 30 (Sm); Lucaston V, 30 (Dke).
T. melanops Meig. Riverton V, 14, Westville VI, 6, Clementon VI, 3.
T. pilosellus Loew. Riverton VI, 30.
T. johnsoni Coq. Riverton IV, 30, VI, 18.
T. monilis Linn. (*annulatus* Say.) Great Piece Meadow V, 7 (Coll); Riverton V, 14, IX, 5.
T. bifasciatus Coq. Riverton IV, 30.
T. pallens Coq. Riverton.
T. baltimoreus Macq. Riverton V, 14, VI, 18.
T. turpis Zett. Boonton III, 8, 12 (GG).

PSILOTANYPUS Kieffer.

- P. occidentalis** Coq. Riverton IX, 14.

PROTENTHES Johannsen.

- P. culiciformis** Linne. Riverton (Jn); Lahaway VI, 10 (Coll).

CHASMATONOTUS Loew.

- C. bimaculatus** O. S. Westville (Vk).

THALASSOMYIA Schiner.

- T. platypus** Coq. Dunnfield, Del. Water Gap VII, 8.

CHIRONOMUS Meigen.

- C. brunneus** Walk. Dover VII, 16.
C. cristatus Fab. New Brunswick (Sm); Common, Westville VI, 6, Clementon V, 10, Riverton III, 20, Shark River VII, 12 (Jn).
C. jucundus Walk. Riverton VIII, 21.
C. lineola Wied. Common, Westville VI, 6, VII, 4, VIII, 13.
C. modestus Say. Westville VII, 13, Riverton V, 14.
C. pedestris Meig. Dunnfield, Del. Water Gap VII, 8, 12.
C. dispar Meig. Clementon VI, 3, VIII, 11.
C. brachialis Coq. Asbury Park VIII, 16, Westville VI, 21.
C. pedellus De Geer. Riverton IV, 30, V, 14, Clementon VI, 3.
C. fascipennis Zett. Clementon VI, 3.
C. tæniapennis Coq. Dunnfield, Del. Water Gap VII, 8.

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- C. albipennis* Meig. Riverton VI, 7-20, Westville VI, 6.
- C. tendens* Fab. Clementon VI, 3, Riverton IV, 30.
- C. viridicollis* V. d. W. Riverton IV, 30.
- C. nitidulus* Coq. Riverton V, 14.
- C. tenellus* Zett. Del. Water Gap VI, 12.
- C. fascipes* Coq. Riverton VIII, 11.
- C. festivus* Say. Westville.
- C. ferrugineovittatus* Zett. Clementon V, 11 (GG).
- C. aberrans* Johans. "New Jersey."
- C. nigricans* Johans. Culver's Lake V, 29 (Sm); Riverton.
- C. riparius* Meig. "New Jersey."
- C. prasinus* Meig. Cape May IX, 24 (Sm).
- C. brunneipennis* Johans. New Jersey.
- C. dorsalis* Meig. Orange VI, 22 (Coll); Delair VII, 14.
- C. zonopterus* Mitchell. Clementon.

CAMPTOCLADIUS V. d. Wulp.

- C. byssinus* Schrank. Riverton IV, 30.
- C. aterrimus* Meig. "New Jersey" (Johannsen).

ORTHOCLADIUS V. d. Wulp.

- O. nivoriundus* Fitch. Riverton IV, 15, Shark River VII, 12.
- O. par* Coq. Riverton VII, 3.
- O. politus* Coq. Riverton VIII, 17.

CRICOTOPUS V. d. Wulp.

- C. sylvestris* Fab. Dreer's water garden, Riverton VI, 9, larvæ injure leaves of "Victoria regia" (Sm); Westville VI, 6 (Jn), Anglesea V, 28 (Sm).
- C. geminatus* Say. Riverton VI, 16-18.
- C. tremulus* Linn. Dunnfield, Del. Water Gap VII, 8-12, Riverton V, 14.

METRIOCNEMUS V. d. Wulp.

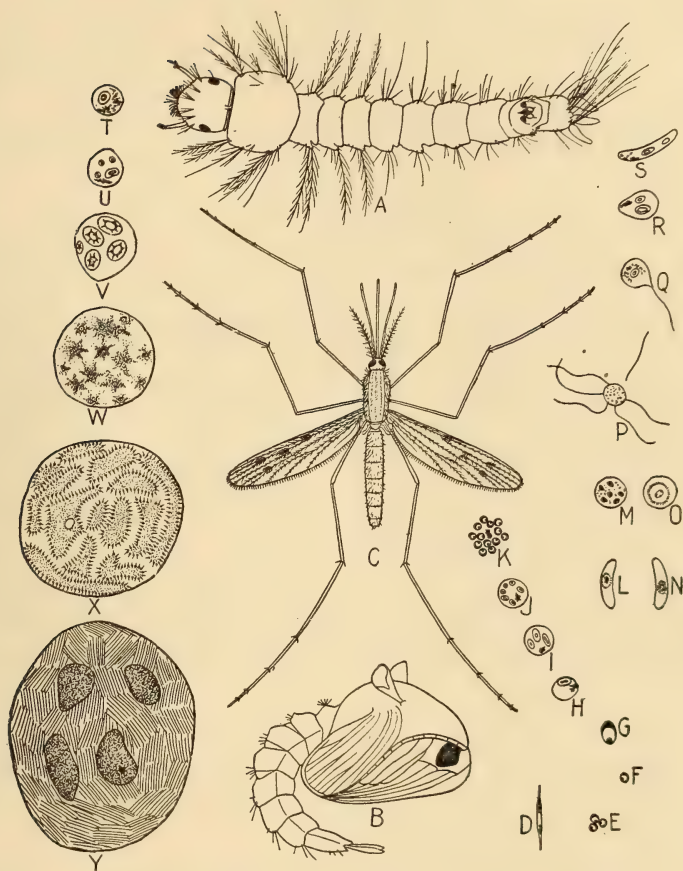
- M. par* Johans. "New Jersey."

EURYCNEMUS V. d. Wulp.

- E. scitulus* Coq. Riverton IV, 30, VI, 4, VIII, 3.

Family CULICIDÆ.

These are the mosquitoes, for which New Jersey has a well-established reputation. Among the biting flies they are distinguished by their slender body, long slender legs and long slender beak or proboscis. The larvæ,



Anopheles and Malaria: *a*, larva; *b*, pupa; *c*, adult; *d*, the blast introduced into the blood by the mosquito; *e* to *j*, stages through which the Plasmodium passes in the red blood-corpuscle; *k*, the spores which enter new blood-corpuscles; *l*, *m*, the microgamete; *n*, *o*, the macrogamete; *p*, flagellæ forming; *q*, union of a flagellum with macrogamete; *r*, fusion of nuclei; *s*, the vermicule; *t* to *y*, formation of the zygote in the mosquito stomach; the fully developed zygote, *y*, rupturing to produce blasts *a*.

Fig. 295.

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known as wrigglers, live in water, and can develop in water only; but the conditions under which the different species live vary greatly. Not all the mosquitoes bite human beings and only a few of them follow him into his habitation, so that the majority of species are indifferent to the great bulk of mankind. But some species are either almost unbearable pests, rendering large areas almost uninhabitable, or are actual carriers of disease organisms. Destructive methods for the pestiferous species are now well understood, and the day of their control is almost at hand.

ANOPHELES Meig.

The members of this genus are intermediate hosts for the organism causing malaria in man, though of the species occurring in New Jersey only one—"quadrimaculatus"—has been actually convicted of that offense. The adults may be known by their method of holding the body at a nearly right angle to the plane of the surface upon which they are at rest. The eggs are laid singly on the surface of the water and the larvæ float on the surface, parallel with it. They inhabit pools of ground-water, the edges of overgrown swamps or ponds, the quiet eddies of sluggish streams and sometimes even lot-pools, pails, buckets or other receptacles containing stagnant water. They are not so abundant in sewage water. The adults winter in barns, cellars, hollow trees and similar sheltered places, only the females living over.

- A. *punctipennis* Say. Occurs throughout the State, but more commonly in the southern portions. Larvæ may be found from May to November; but are usually rare until after midsummer; after mid-September only stragglers remain. Breeds in almost any waters except on salt marshes.
- A. *quadrimaculatus* Say—*maculipennis* of American authors. This is the species that has been convicted of transmitting malaria. It occurs throughout the State, but is rather more common in the northern counties. The general habits are like those of the preceding, but the larvæ occur also in more shaded areas, and occasionally in the brackish waters of the salt marshes.
- A. *crucians* Wied. Occurs chiefly along the coast line from Elizabeth to Cape May, more common southwardly, and the larvæ breed chiefly on the salt marsh or on swampy areas not far inland. The species does not become obvious until mid-summer and remains until late fall. The inland points at which single examples have been taken are Manumuskine X, 21 (Dke), Delair (Seal) and Lahaway X, 8 (Brakeley).
- A. *barberi* Coq. Bordentown VIII, 14, 16, adults (Brakeley); Chester IX, 6-11 larvæ (Dn). This species breeds exclusively in the water in tree holes and never gets far away from its breeding grounds.

PSOROPHORA Desv.

- P. *ciliata* Fabr. Local throughout the State and rarely common as an adult. This is our largest species and lays its eggs in depressed

areas likely to be rain-filled. The larvæ develop in these temporary pools and feed upon other mosquito wrigglers. They are the giants of their kind, and if there is not sufficient food for all, they eat each other. Larvæ have been found from June to September 25, and adults from July 2 to September 30.

AEDES Meig.

The species now referred to this genus are those species of what we have been calling "*Culex*," that do not lay their eggs in rafts or boat-shaped masses. They may be laid singly or in little masses in the mud of depressed areas, or on the surface of the water, sinking to the bottom and usually passing the winter in that stage, covered by water or unprotected in the mud.

- A. *sayi* D. & K. (*Janthinosoma musica* Say.) Locally common, chiefly in the northern sections of the State. The larvæ breed, as a rule, in heavily shaded woodland pools, and the adults do not leave the vicinity of their place of birth. They are ferocious biters, and sometimes in the Great Piece Meadow region are locally almost unbearable. Larvæ have been found only from New Brunswick northward, June to September; adults have been taken also at Spring Lake VI, 30, and Lakehurst VIII, 16.
- A. *jamaicensis* Theob. Locally common, breeding in open lot pools, though isolated examples of the larvæ have been taken in woodland pools. We have only found it at Millburn, Newark, New Brunswick and Delair in July and August; but undoubtedly it is more generally distributed. The adult has never been found attacking man, and though a breeding place is not far from my house, I have never found examples on my porches.
- A. *discolor* Coq. Delair, VI, 18, VII, 24, VIII, 15. Larvæ have been taken only by Mr. Seal in the one place on the dates mentioned, and we have not found it in any stage elsewhere. It is truly a rare species.
- A. *sollicitans* Wlk. This is the common, banded-leg salt marsh mosquito. It breeds exclusively on the salt marshes in fresh, brackish or salt water and flies inland long distances, forming the predominating pest within its range—which means more than half the State—during the entire summer. From Barnegat Bay south larvæ begin to hatch in March, and adults are on the wing in April or May, and thereafter as many as ten broods may develop before November, when the last stragglers mature. In the more northern marshes larvæ do not usually appear until June, "*cantator*" replacing it as the early spring form. The eggs are laid in depressions in the marsh mud and must dry out before they can hatch. It is in this stage that the winter is passed.
- A. *tæniorhynchus* Wied. Has the same habits as the preceding, but is not nearly so abundant and does not migrate so far. Occasionally it is quite numerous in the southern part of the State; but in some seasons it is not seen at all on the more northern marshes.

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- A. *sylvicola* Gross. Larvæ were taken at Paterson in May, at New Brunswick May and June. Adults were taken also at Westville and Mount Holly, specimens occurring near New Brunswick until VII, 28. This is rather a rare species, breeding only in pools in dense woodland, whose shelter the adults never leave. There is only a single spring brood, the late captures representing straggling survivors. This species was at first identified with "squamiger," which later proved to be different in habits and early stages.
- A. *niveitarsis* Coq. Larvæ were found near Paterson, V, 9, 14, in a rocky, mountain pool, and the adults bred from them are the types of the species, no other examples of which have been since taken.
- A. *cantator* Coq. Also a salt marsh breeder, occurring along the entire coast line, but much more abundant in the more northern ranges. It replaces "sollicitans" north of Barnegat Bay as the early spring form, and from larvæ which hatch in March or April the first brood comes early in May. After mid-summer it is much less numerous and generally replaced by "sollicitans." It has the same egg-laying and migrating habits as the latter species, and like it breeds until the meadows are frozen—larvæ being quite generally found under the ice when the pools freeze in early winter.
- A. *subcantans* Felt. Occurs throughout the northern parts of the State in woodland pools. There is only a single spring brood, larvæ appearing in March and maturing in early May; but the adults linger until mid-summer. Larvæ have been actually found at or near Elizabeth, Newark, Arlington, Cranford, Millburn, Morristown and in the Great Piece Meadows. This species was at first believed to be identical with the European "cantans," but has been proved distinct by careful study.
- A. *abfitchii* Felt. Has the same range as the preceding and much the same habits. It has been found a little further south, at New Brunswick, and the adults occurred as far north as Lake Hopatcong and Swartswood Lake. Mr. Grossbeck notes that, for breeding, both this and the previous species "select swampy woodland areas or hilly regions scattered over with large pools—small isolated pools being rarely inhabited by them." The adults are hard biters, but do not leave the woodland. This species was described by Mr. Grossbeck as "siphonalis" at about the same time that Dr. Felt described his species, but Dr. Felt's description was first published.
- A. *fitchii* Felt. Very much like the preceding in appearance and probably in habit; but rare in New Jersey. Mr. Brakeley has taken larvæ at Lahaway and Mr. Grossbeck in the Great Piece Meadows, both in April.
- A. *sylvestris* Theob. Occurs throughout the State and throughout the summer, sometimes in considerable numbers; but rarely attempts to bite and does not enter houses. Larvæ appear in woodland pools early in April, but later occur in more open places—anything from a lot or even a clean gutter-pool to an overgrown swamp area serving to develop them.

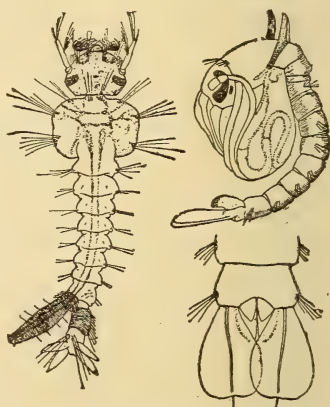
- A. signifer** Coq. Larvæ have been taken at Chester, IX, 5, XI, 17, Riverton IX, 8, Delair IX, 20, Lahaway IX. This species breeds normally in tree holes, though occasionally it resorts to barrels or old tubs; it has only been taken in late fall.
- A. atropalpus** Coq. This species breeds only in rock-pools. It has been taken in Maine and in Maryland, but not yet in New Jersey. It is almost certain that it occurs along the shores of the Delaware River near the Water Gap.
- A. canadensis** Theob. Throughout the State. The commonest of our woodland pool mosquitoes, larvæ hatching from over-wintering eggs before the ice is permanently off the surface. There is one heavy regular spring brood, but larvæ may be found in greater or less abundance throughout the season. Bites readily enough in the woods, but does not follow into the open and never enters houses.
- A. dyari** Coq. Culver's Lake V, 29, bred from pupa.
- A. triseriatus** Say. Taken in many localities in the northern half of the State; but undoubtedly occurs everywhere in it. Breeds normally in tree holes; but also occasionally in pails or other wooden receptacles. Larvæ have been found as early as April 18 (Paterson), as late as November 17 (Chester), and at all periods throughout the summer.
- A. serratus** Theob. Breeds in low, swampy woodland, and sometimes in mountain pools. Adults have been taken at Great Piece Meadow IX, 17, New Brunswick VI, 23, X, 5, Cape May IX, 21. Larvæ have been found at Great Piece Meadow IX, 9, Orange Mts. VIII, 6, New Brunswick VII, 29, VIII, 13, IX, 3, 30.
- A. dupreei** Coq. Occurs in the same pools with the preceding and at the same time. It is a small, rare species; the adult does not bite humans and the larva is a bottom feeder that gets its supply of oxygen from the water itself.
- A. abserratus** Felt. Larvæ have been taken in the Orange Mts. IV, 20, and at New Brunswick IV, 16 to V, 2. It is probably the earliest of the spring species to mature, the larvæ rarely extending into May, and not appearing again later in the season. Breeds in low, swampy woodlands and in mountain pools.
- A. trivittatus** Coq. Quite generally distributed throughout the State; hardly common, but more abundant in the northern half. Larvæ from V, 8 to VIII, 12; adults from VII, 2 to IX, 3. Breed in unsheltered pools, associated with "sylvestris."
- A. pretans** Gross. Larvæ in the Great Piece Meadow IV, 19-V, 10; adults, Chester VII, 30, IX, 10, Great Piece Meadow IX, 13, Lake Hopatcong VII, 21, Trenton VII, 18. Mr. Grossbeck writes: "Taken rarely except in the Great Piece Meadows, where, in some years, it occurs in countless millions."
- A. inconspicuous** Gross. Larvæ taken on Garret Mt., Paterson, IX, 29, which produced adults X, 4, 5. They were found in a rock pool, and have not been found since.

- A. aurifer** Coq. Larvæ from III, 23-V, 10 at Lahaway, Arlington V, 9, Great Piece Meadows V. Adults from early May to late August, the specimens matured in May living throughout the summer and biting fiercely whenever they get a chance. They have been found in troublesome numbers at Lake Hopatcong, Springdale, Culver's Lake and Swartswood Lake. Breeds in woodland pools, the larger and more permanent being preferred.
- A. pallidohirta** Gross. Larvæ taken from a woodland pool on the Orange Mts.; adults emerged V, 19, 22. Not found since, nor elsewhere.
- A. fuscus** O. S. Occurs throughout the State rarely, and only in spring. It is a small species that does not attack man, and the larva occurs in pools, both woodland and open.

CULEX Linn.

As now restricted, this genus contains those species of mosquitoes that lay their eggs in boat-shaped rafts on the surface of the water. When at rest, the body is held parallel to the surface on which the mosquito is placed—a character shared with the species of "Aedes" in distinction from the species of "Anopheles."

- C. pipiens** Linn. The "house" or "rain-barrel" mosquito. Common throughout the State throughout the year. Hibernates as an adult in cellars, basements, barns and other buildings, and begins breeding early in May. Breeds in pools and puddles of all kinds and wherever even a cupful of water remains for a week or ten days. Cisterns and manure pits offer equal attractions, and sewer basins in cities are favorite resorts. In general there is no water in which this species does not breed, if there are no natural enemies or adverse natural conditions.



Larva and pupa of the house mosquito.

Fig. 296.

- C. restuans** Theob. Similar in habit and appearance to the preceding, but less abundant, and the larva on the whole prefers cleaner water. Nevertheless, it does sometimes occur in dirty, or even foul water.
- C. salinarius** Coq. Breeds only on the salt marshes from the last days of May to the end of November. The adult resembles the common "house mosquito" and has similar habits.
- C. territans** Wlk. Occurs throughout the State, breeding continuously from April to October, sparingly at first, more abundantly later in the season. The larvæ are essentially clean water forms, and seem to

prefer the more permanent bodies of water, but they are occasionally found in puddles and rarely in rain barrels.

- C. saxatilis** Gross. Larvæ occurred in a rock-bottomed pool on the Garret Mt., Paterson, Aug. 31, and adults emerged the same day and the one following; it has not been met with since.
- C. melanurus** Coq. The larvæ breed and winter in cold spring pools in Sphagnum swamps, among the bottom material. They have also been found in early August with the egg boat and may breed all summer. Thus far found only at Lahaway.

COQUILLETTIDIA Dyar.

- C. perturbans** Wlk. Local throughout the State and sometimes very common. Adults appear in May and continue into September. Eggs are laid in rafts in overgrown swamps, and the larvæ work into the bottom mud, attach themselves to grass roots, and there remain until the following year. Larval growth is very slow, and the adult is very long lived and a fierce biter. It comes freely to porches, and is not backward in entering houses, making it locally a first-class pest.

URANOTÆNIA Arrib.

- U. sapphirina** O. S. Local, but probably found throughout the State. Larvæ have been found in the Great Piece Meadows VIII, 10, Irvington IX, 5, Trenton VIII, 5, Metedeconk Neck IX, 23, Lahaway VI, Cape May. Breeds in open swamp areas well overgrown with floating vegetation, the eggs laid in boat-shaped masses. The adult is a small insect marked with metallic blue scales and does not bite.

WYEOMYIA Theob.

- W. smithii** Coq. Breeds in the leaves of pitcher plants, "Sarracenia," wherever these occur in the State. The adult is a small insect that does not bite and lays its eggs in the leaves, fastened to the sides when they have no water, or on the surface when they are full. Larvæ may be found at all times of the year, the winter being passed in that stage, sometimes active, in mild weather, sometimes frozen solid. The first adults mature late in May.

Family CORETHRIDÆ.

The members of this family have until recently been included with the mosquitoes; but in their light colors and generally weak appearance they come nearer to the "Chironomidæ." The mouth parts are not extended, and are not furnished with lancets, so that they cannot bite. Except in the genus "Corethrella" the known larvæ of our species are not dependent upon atmospheric air. They live in the water, maintaining a horizontal position some distance below the surface, and are so transparent as to be almost invisible. They are predatory in habit.

SAYOMYIA Coq.

- S. albipes** Johann. Larvæ have been taken in the Great Piece Meadows, at Paterson IV, VII, IX, Arlington V, Newark VIII, Trenton, Delair VII, and the winter is apparently passed in that stage. Breeds in the more permanent woodland pools, but is also found in more open water.
- S. punctipennis** Say. Chester VIII, 1, Delair IX, 17, Riverton V, 19.

CORETHRA Meig.

- C. cinctipes** Coq. Lake Hopatcong VII, 22, Great Piece Meadow IV, 10, Paterson V, 6, New Brunswick V, 3, Lahaway III, 23-IV, 26—all larvæ. This is a common spring species breeding in large woodland pools, the July specimen being a straggler. The larva is predaceous, and when food is scarce becomes cannibalistic.
- C. lintneri** Felt. Larvæ taken at Millburn in May were not recognized as distinct from the preceding until the adults emerged a few days later.

CORETHRELLA Coq.

- C. brakeleyi** Coq. This is a very rare species which breeds in cold spring pools and sphagnum swamps. Larvæ have been taken by Mr. Brakeley at Lahaway in almost every month of the year, and beside that it has been taken only at Delair, by Mr. Seal, and at Trenton by Mr. Grossbeck.

Family MYCETOPHILIDÆ.

These are fungus-gnats, also resembling mosquitoes or midges, but the antennæ are not verticillate or furnished with whorls of hair. In the male the abdomen ends in a forceps-like process, and in the female in a pointed ovipositor. There are other structural differences to characterize the family, but these are not easily seen except by the student. The larvæ are feeders in fungus and in decaying vegetation generally, and might be considered at worst harmless were it not that they attack cultivated mushrooms. The larvæ are white, slender, have a black head, and often live in large colonies. Some of them have the curious habit of forming great rope-like masses when ready to enter the pupal stage, sometimes travelling considerable distances to find a suitable place.

Where they occur in mushroom beds, fumigating frequently with tobacco or pyrethrum to kill the adults inside, and keeping all windows closely screened to prevent the entrance of specimens from outside, is the only practical measure known to me.

PLESIASTINA Winn. (SYMMERUS Wik.)

- P. annulata** Meig. Riverton IV, 19.

ASYNDULUM Latr.

- A. montanum** Roeder. Dunnfield, Del. Water Gap VII, 11, 15.

CEROPLATUS Bosc.

- C. clausus** Coq. New Brunswick (Sm).

PLATYURA Meig.

- P. diluta** Loew. Dunnfield, Del. Water Gap VII, 11, 15.
P. mendosa Loew. Clementon V, 30.
P. tæniata Winn. Dunnfield, Del. Water Gap VII 12.
P. elegans Coq. Orange Mts., Shark River VII, 12.
P. inops Coq. Dunnfield, Del. Water Gap VII, 8, 12.
P. melasoma Loew. Delaware Water Gap VII, 12.
P. subterminalis Say. Riverton VIII, 11 (Jn); Lucaston IX, 2 (Dke); Trenton VIII, 23 (Hk).
P. fascipennis Say. DaCosta VIII, 9 (Dke).

SCIOPHILA Meigen.

- S. littoralis** Say. Del. Water Gap VII, 8, 13, Dover VI, 17, Merchantville VI, 28, Westville VII, 21, Clementon VI, 3 (Jn); New Brunswick VII, 20 (Sm).

NEOEMPHERIA O. S.

- N. balioptera** Loew. Princeton VII, 21, Westville VIII, 23.
N. nepticula Loew. Merchantville VI, 28.
N. didyma Loew. Woodbury VI, 7 (Jn); Lucaston IX, 12 (Dke).

POLYLEPTA Winn.

- P. tibialis** Coq. Dunnfield, Del. Water Gap VII, 8, Westville VI, 6.

ACNEMIA Winn.

- A. flaveola** Coq. Dunnfield, Del. Water Gap VII, 11.

SYNTEMNA Winn.

- S. polyzona** Loew. Clementon VI, 3.

BOLETINA Stæger.

- B. tricineta** Loew. Dunnfield, Del. Water Gap VII, 15, Dover VII, 17, Clementon VI, 3.
B. grœnlandica Stæg. Forest Hill III, IV (Wdt); Merchantville III, 13 (Vk).

LEPTOMORPHUS Curt.

- L. parvulus* Coq. Dunnfield, Del. Water Gap VII, 12.
L. walkeri Curtis. Trenton VIII, 23 (Hk).

EPICYPTA Winn.

- E. punctum* Stann. Dunnfield, Del. Water Gap. VII, 15.
E. pulicaria Coq. Riverton IV, 19.

DOCOSIA Winn.

- D. dichroa* Loew. Malaga VI, 1, Iona V, 10 (Dke).

NEOGLAPHYROPTERA O. S.

- N. bivittata* Say. Ft. Lee V (Lv); Princeton VII, 21, Jamesburg VII, 4,
 Atco VII, 12 (Jn).
N. opima Loew. Dover VI, 17, Merchantville VI, 28.
N. sublunata Loew. Merchantville VI, 28.
N. ventralis Say. (Leja) Dunnfield, Del. Water Gap VII, 8, 15.

TRICHONTA Winn.

- T. perspicua* V. d. W. Riverton IV, 16.

EXECHIA Winn.

- E. analis* Coq. Dunnfield, Del. Water Gap VII, 8.

MYCETOPHILA Meigen.

- M. punctata* Meig. Riverton III, 20-IV, 8 (Jn); Merchantville IX, 16
 (Dke).
M. sigmoides Loew. Del. Water Gap VII, 8, Riverton III, 6.
M. contigua Walk. Riverton III, 6, IX, 9.
M. obscura Walk. Trenton IV, 19 (Hk); Riverton III, 6, Clementon VI,
 16.
M. vitrea Coq. Dunnfield, Del. Water Gap VII, 12.
M. discoidea Say. New Brunswick VI, 11 (Coll).

DYNATOSOMA Winn.

- D. scalaris* Loew. (*Mycetophila*) Del. Water Gap VII, 8, Riverton III, 6,
 Clementon V, 10.

MACROCERA Meig.

- M. clara* Loew. Dunnfield VII, 8, Clementon VIII, 9 (Jn).
M. formosa Loew. Del. Water Gap VII, 12, Merchantville V, 28, Clemen-
 ton VIII, 9.

- M. nebulosa* Coq. Clementon VI, 3, VIII, 9.
M. hirsuta Loew. Dunnfield, Del. Water Gap VII, 11.
M. inconcinna Loew. Orange Mts. VIII (Wdt).

EUGNORISTE Coquillett.

- E. occidentalis* Coq. Trenton VIII, 3 (Hk).

SCIARA Meigen.

- S. fulvicauda* Felt. Types, Atlantic Co., from decayed blackberry roots (Sm).
S. pauciseta Felt. New Brunswick, types from decaying potatoes IX (Sm).
S. multiseta Felt. New Brunswick, types bred from mushrooms V, and this is the common species in mushroom cellars with us (Sm).
S. polita Say. Clementon V, 30.
S. inconstans Fitch. Newark, New Brunswick VIII, 7 (Coll); Riverton II, 26, Clementon VI, 3.
S. abbreviata Walk. Anglesea VII, 12 (Sm).
S. fuliginosa Fitch. Palisades (Lv); N. Woodbury VI, 17, Iona VI, 2 (Dke).
S. femorata Say. Fort Lee IV, V (Lv).

HESPERODES Coquillett.

- H. johnsoni* Coq. Delaware Water Gap VII, 12.

Family **CÆCIDOMYIIDÆ.**

Small, slender, mosquito-like flies with broad wings, long slender antennæ with cylindrical or bead-like joints, the males often with whorls of long hair on the segments, whence they are known as verticillate. On the whole the insects are fragile in appearance, slow in flight, and they are popularly known as "gall-gnats" or "gall-midges," because the larvæ of many species produce abnormal growths or galls on a great variety of vegetation. These larvæ are small, elongate-oval legless grubs, bluntly pointed at both ends, often with a chitinous process, known as a breast-bone, on the under side, near the anterior end.

Some of the species belonging here are among the most destructive of those in the order, and the injury caused by them is of the most diverse character. In some cases there is a true, gall-like swelling of the tissue; in others it is a characteristic crippling or folding of a leaf or of a growing tip, or even a mere swelling of the tissue. Some species produce no visible swellings or distortions at all, and some feed in or on seeds, causing rather a shrivelling than a swelling. Much attention has recently been paid to these insects by Mr. William Beutenmuller, of the American Museum of Natural History, who has been good enough to pre-

pare the systematic part of this list, and by Dr. E. P. Felt, State Entomologist of New York, and a great many new species have been described, some of which will undoubtedly be found in New Jersey. Mr. Beutenmuller has in general included only actual records, mostly of his own collecting, and the notes on food plants, etc., are his, unless otherwise credited. In some cases galls have been described, of which the makers are yet unknown, and these are separately listed. Dr. Felt has kindly supplied additional notes from his breedings and studies, but I have not been able to incorporate all his systematic suggestions.

As the species differ so widely in habit, so the methods of dealing with them are diverse. Insecticides are available in the smallest number of cases, and usually it is some change in cultural method that must be relied upon to prevent injury.

LASIOPTERA Meigen.

- L. carbonifera* Felt. Makes galls on leaves of goldenrod; common and g. d. (Bt). The gall was first described by Osten Sacken, and the name is so credited in the last edition.
- L. cornicola* Beut. Ft. Lee district. Galls on trunks and branches of dogwood, "*Cornus stolonifera*" IX-VI (Bt); Staten Island (Ds).
- L. cylindrigallæ* Felt. Ft. Lee district IV, V (Bt); Staten Island, gall elongate on stems of goldenrod IV (Ft).
- L. farinosa* O. S. Throughout the State, locally common, galls on leaves of blackberry, "*Rubus villosus*" VIII-X (Bt). See in this connection "*L. nodulosa*" Beut.
- L. humulicaulis* Felt. New Jersey district (Bt); gall on stem of hop (Ft).
- L. linderæ* Beut. Ft. Lee district and elsewhere, sometimes common; galls on branches of spice bush, "*Lindera benzoin*" X-VI (Bt); Staten Island, from irregular sub-cortical gall.
- L. lycopi* Felt. Plainfield; gall on bugleweed "*Lycopus virginicus*" IX-V (Bt).
- L. nodulosa* Beut. Ft. Lee district; galls on branches of blackberry, "*Rubus villosus*" X-VI (Bt). This is the species referred to in the last edition as "*farinosa*." I have found it, locally, from New Brunswick southward; sometimes also on dewberry, but never causing actual injury in cultivated fields.
- L. sambuci* Felt. Ft. Lee district; galls on stems of elder, "*Sambucus canadensis*" IX-VI (Bt); Staten Island (Ds).
- L. solidaginis* O. S. New Jersey district; larva probably inquiline in galls on *Solidago* (Bt).
- L. tumifica* Beut. Ft. Lee district; gall on stalk of golden-rod, "*Solidago rugosa*" IX-VI (Bt); Staten Island, from eccentric sub-globular stem gall (Ft).
- L. vernoniæ* Beut. Ft. Lee district and elsewhere; galls on leaves of ironweed, "*Vernonia noveboracensis*" IX (Bt); Staten Island IX (Ds).

- L. viburnicola** Beut. Ft. Lee district; galls on branches of arrowwood, "*Viburnum dentatum*" X-VI (Bt); Staten Island (Ft).
L. vitinea Felt. Staten Island VI, 15; obpyriform, slightly curved gall on leaf petiole of grape (Ft).
L. vitis O. S. Throughout the State, local on grape, V, VI (Sm); makes swellings on stems and leaf galls of wild grapes (Bt).

CHORISTONEURA Rübs.

- C. hibisci** Felt. Staten Island IV; gall on stem of marshmallow, "*Hibiscus moschatatus*" (Ft).
C. eupatorii Felt. Staten Island V; oval gall on stem of "*Eupatorium*" (Ft).

RHABDOPHAGA Westw.

- R. batatas** Walsh. Montclair, Ft. Lee district; galls on twigs of "*Salix discolor*" and allied species of willow (Bt); Staten Island (Ds).
R. ramuscula Felt. Staten Island, from willow twigs showing little or no swelling (Ft).
R. brassicoides Walsh. Greenwood Lake, Montclair, Ft. Lee district VII-IX, galls on branches of willow (Bt).
R. rigidæ O. S. Montclair, Ft. Lee district, galls on low willows (Bt); Staten Island (Ds).
R. salicifolia Felt. New Jersey district (Bt); bred from a pouch gall on "*Spiræa salicifolia*" VI (Ft).
R. strobiloides O. S. Del. Water Gap VI (Jn); Greenwood Lake, Montclair, Orange Mts., Englewood, Ft. Lee and g. d., galls on tip of branches of low willows VIII-V (Bt).

DASYNEURA Rond.

- D. gleditschiæ** O. S. Sometimes common locally on leaves of honey locust, "*Gleditschia triacanthos*" VI (Bt); New Brunswick (Sm).
D. grossulariæ Fitch. New Jersey district; larva in gooseberries (Bt).
D. hirtipes O. S. Ft. Lee district, Carlstadt; gall on fragrant goldenrod, "*Solidago graminifolia*" VI, VII (Bt).
D. leguminicola Lint. The clover-seed midge; more or less common throughout the State; but scarcely injurious because not much cloverseed is raised, and the value of the crop for hay is not affected. If cloverseed is wanted it is necessary to cut an early crop of flowers for hay and make seed from the later flowers.
D. coryli Felt. Reared from corrugated leaves of "*Corylus*" at West Nyack, N. Y. (Ft).
D. rhois Coq. New Jersey district; gall on roots of poison ivy (Bt).
D. pseudacaciæ Fitch. Ft. Lee district (Bt); New Brunswick, common on leaves of locust, "*Robinia pseudacacia*" (Sm).



Fig. 297.—The Hessian fly, *Mayetiola destructor*: on the left a healthy stalk of wheat and on the right one infested at *h* by the "fly," showing galls; *a*, egg; *b*, larva; *c*, flaxseed; *d*, pupa; all very much enlarged; *e*, fly ovipositing on leaf, natural size; *f*, female; *g*, male fly, much enlarged; *i*, the parasite, *Merisus destructor*; also much enlarged.

- D. serrulatæ* O. S. Montclair, Ft. Lee district, Lakehurst, common locally, gall on bud of alder, "*Alnus serrulatus*" IX-VI (Bt); Staten Island (Ds).
- D. solidaginis* Loew. Common throughout the State; gall on goldenrod (Bt); Clementon VIII (Jn).

ARNOLDIA Kieffer.

- A. fraxinifolia* Felt. Newfoundland VII, 25, gall on young ash leaflets (Ft).
- A. vitis* Felt. New Jersey district (Bt); from galls of "*Lasioptera vitis*" (Ft).

ASPHONDYLIA Loew.

- A. azaleæ* Felt. New Jersey district (Bt); galls on buds of azalea (Ft).
- A. conspicua* O. S. New Jersey district; gall on stem of cone-flower, "*Rudbeckia triloba*" VIII, IX (Bt).
- A. globulus* O. S. New Jersey district; gall on stem of sun-flower, "*Helianthus gigantea*" VIII, IX (Bt).
- A. patens* Beut. New Jersey district; gall on aster VIII, IX (Bt).
- A. solidaginis* Beut. Montclair, Ft. Lee district, gall on leaf of goldenrod (Bt).

RHOPALOMYIA Rübs.

- R. fusiformis* Felt. Ft. Lee district; galls on leaves and flowers of fragrant goldenrod, "*Solidago graminifolia*" VIII, IX (Bt).
- R. capitata* Felt. Common at West Nyack, N. Y., just north of the New Jersey line (Ft).
- R. inquisitor* Felt. Common at West Nyack, N. Y. (Ft).
- R. major* Felt. Staten Island V, 31 (Ft).
- R. anthophila* O. S. Staten Island (Ft).

MAYETIOLA Kieffer.

- M. destructor* Say. The "Hessian fly." Sometimes very destructive north of the red shale line. The method usually adopted to avoid injury is to plant as late as is safe. In the southern counties it may be delayed until after mid-September and injury is rare; in the northern counties planting soon after September 1st is usual and this is dangerous. The flies usually emerge after the early September rains and are in the fields for two weeks thereafter. Sometimes a scant early seeding is made as a trap, and this is plowed under about September 10 and the real crop put in.

CONTARINIA Rond.

- C. pyrivora* Riley. The "pear midge." Infests pear, preferring the Lawrence, causes an irregular lumpy growth, the larvæ eating out the core in June. This species has been gradually worked out and now maintains itself only in a few places near New Brunswick and Newark.
- C. tritici* Kirby. Locally and seasonally abundant north of the red shale in wheat kernels. Not really injurious since 1889.

CECIDOMYIA Meigen.

- C. annulipes* Walsh. New Jersey district, inquiline in galls of "*Rhabdophaga strobiloides*" (Bt).
- C. anthophila* O. S. New Jersey district; gall on golden-rod (Bt).
- C. atricornis* Walsh. New Jersey district; inquiline in gall of "*Rhabdophaga strobiloides*" (Bt).
- C. bulla* Wash. New Jersey district; gall on leaves of wild sunflowers "*Helianthus decapetatus*" and "*divaricata*" VIII, IX (Bt).
- C. caryæ* O. S. Ft. Lee district; galls on leaves of hickory (Bt).
- C. cerasifolia* Felt. Newfoundland IX, 4; galls on leaves of choke cherry (Ft).
- C. clavula* Beut. Orange Mts., Montclair, Ft. Lee district, common on the terminal twigs of dogwood, "*Cornus florida*" VIII, IX (Bt); Staten Island (Ds).
- C. helianthi* Brodie. Staten Island VIII, IX (Ds).
- C. lysimachiæ* Beut. Carlstadt, Ft. Lee district and elsewhere; galls in buds of loosestrife, "*Lysimachia*" VI (Bt); Jamesburg and throughout south Jersey about and on cranberry bogs; this seems to be the species which I believed identical with that infesting cranberry (Sm).
- C. meibomiæ* Beut. Staten Island (Ds); galls on tick-trefoil, "*Meibomia*" sp., VIII, IX (Bt).
- C. meibomiifoliæ* Beut. Carlstadt; galls locally common VIII, on buds of "*Meibomia canadensis*" (Bt).
- C. myrica* Beut. Carlstadt; galls locally common on "*Myrica cerifera*" (Bt).
- C. nyssæcola* Beut. Ft. Lee district and elsewhere, sometimes very common, galls on the edges of leaves of sour-gum, "*Nyssa sylvatica*" VI (Bt).
- C. orbitalis* Walsh. New Jersey district; inquiline in galls of "*Rhabdophaga batatas*," "*strobiloides*" and "*brassicoides*" (Bt).
- C. pilulæ* Walsh. Common throughout the State; galls on leaves of red, scarlet, black, scrub, black-jack and pin oak, "*Quercus rubra*," "*coccinea*," "*velutina*," "*nana*," "*marylandica*" and "*palustris*" VII-X (Bt).
- C. pudibunda* O. S. Ft. Lee district; galls on leaves of hornbeam, "*Carpinus caroliniana*" VI, VII (Bt).
- C. resinicola* O. S. Lakehurst and the pine barrens generally VIII, IX (Bt).
- C. rudbeckiæ* Beut. New Jersey district; galls on flower heads of cone-flower, "*Rudbeckia hirta*" VIII (Bt).
- C. seminivora* Beut. Plainfield (Mill); gall is a malformation of the seed capsule of apetalous or cleistogamous flowers of stemless or acaulescent violets, "*Viola cucullata*," "*palmata*," "*affinis*," "*septentrionalis*" VI-X (Bt).

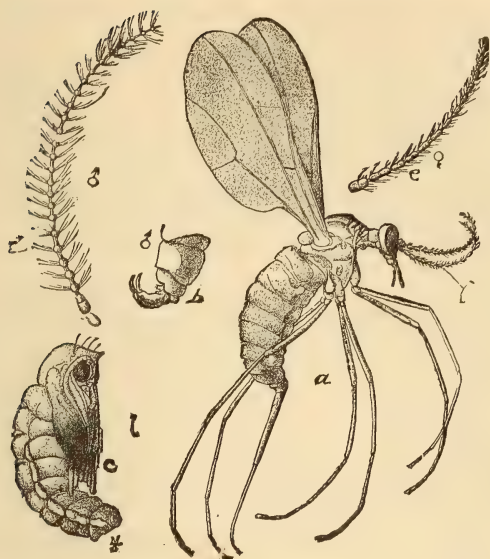


Fig. 298.

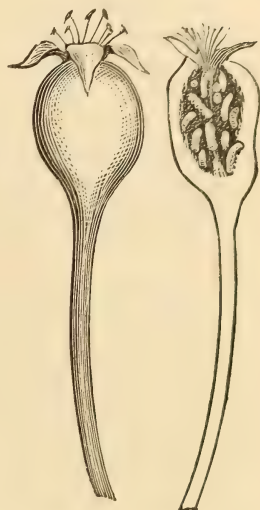


Fig. 299.



Fig. 300.

Fig. 298.—Pear midge, *Contarinia pyrivora*: a, female adult; c, pupa, both enlarged; all other references to structural details.

Fig. 299.—A sound pear and one infested by the larvæ of the pear midge.

Fig. 300.—A series of pears infested by the midge, showing distortions caused by larvæ.

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- C. *thurstoni* Brodie. New Jersey district; galls on sunflower, "*Helianthus divaricata*," VIII, IX (Bt).
- C. *verbenæ* Beut. Ft. Lee district, locally common; galls on leaves of nettle-leaved Vervain, "*Verbena urticifolia*" VI, VII (Bt).
- C. *ulmi* Beut. Carlstadt, Ft. Lee district, sometimes common; galls on leaves of elm, "*Ulmus americana*," VI, VII (Bt).
- C. *oxycoccana* Johns. (*vaccinii* Sm., not O. S.) Infests the terminal growth of the cranberry, throughout South Jersey; locally known as the "tip-worm" and sometimes injurious (Sm). Dr. Felt says it is a "*Dasyneura*."

CECIDOMYLÆ KNOWN BY THEIR GALLS AND LARVÆ ONLY.

- C.? *angelicæ* Beut. Middlesex Co. (Mill); gall on stalk of "*Angelica villosa*" IX, X (Bt).
- C.? *bœhmeriæ* Beut. New Jersey district; gall on stalk of false nettle, "*Bœhmeria cylindrica*" IX (Bt).
- C. *brachypteroides* O. S. Lakehurst and in the pine barrens generally; galls on the leaves of scrub pine, "*Pinus inops*" (Bt).
- C. *caryæcola* O. S. Riverton IX (Jn); common everywhere, galls on leaves of hickory VIII-X (Bt).
- C.? *collinsoniæ* Beut. New Jersey district; galls on leaves of horse balm, "*Collinsonia canadensis*" VIII, IX (Bt).
- C. *coryloides* Walsh. New Jersey; galls on stems of wild grapes, "*Vitis riparia*" and "*cordifolia*" (Bt).
- C. *citrinæ* O. S. Ft. Lee district; galls on the tips of twigs of basswood, "*Tilia americana*," VIII, IX (Bt).
- C. *cynipsea* O. S. New Jersey district; galls on leaves of hickory VIII-X (Bt).
- C. *deserta* Patt. New Jersey district; galls on hackberry, "*Celtis occidentalis*" (Bt).
- C.? *eupatorifloræ* Beut. Ft. Lee district; galls in flower heads of "*Eupatorium ageratoides*" IX (Bt); Staten Island IX (Ds).
- C. *erubescens* O. S. Ft. Lee district; galls on leaves of red oak, "*Quercus rubra*," V, VI (Bt).
- C. *holotricha* O. S. Throughout the State on leaves of hickory (Bt); Staten Island (Ds); Riverton IX (Jn).
- C. *impatiens* O. S. New Jersey; galls on "*Impatiens pallida*" VIII, IX (Bt).
- C. *inopis* O. S. Staten Island (Ds); Riverton VII, IX (Jn); throughout the pine barrens generally; galls on the leaves of scrub pine, "*Pinus inops*."
- C. *liriodendri* O. S. Common throughout the State; galls on the leaves of tulip tree "*Liriodendron tulipifera*."
- C. *majalis* O. S. New Jersey; galls on leaves of pine oak, "*Quercus palustris*" (Bt).

- C. niveipila* O. S. Ft. Lee, galls on young leaves of red oak, "Quercus rubra," V, VI (Bt); Staten Island (Ds); Riverton (Jn).
- C. nuicola* O. S. New Jersey; in the husks of hickory nuts (Bt).
- C. pellex* O. S. Ft. Lee district; galls on leaves of ash, "Fraxinus," V, VI (Bt).
- C. ocellaris* O. S. Throughout the State; galls on leaves of red maple, "Acer rubrum," V, VI (Bt); Staten Island VI (Ds).
- C. persicoides* O. S. Ft. Lee district; galls on the under side of hickory leaves VIII, IX (Bt); Chimney Rock, Bound Brook, New Brunswick (Sm).
- C. poculum* O. S. Common throughout the State; galls on leaves of white oak, "Quercus alba," VIII-X (Bt); the "oak-spangle" of Fitch and a very characteristic structure.
- C. pomum* Walsh & Riley. Throughout the State in early summer on various species of grape, wild and cultivated; a very fleshy and often reddish discolored gall on vines, leaf-stalks and even tendrils; sometimes single, sometimes with a number of cells. Often attracts attention, but is rarely injurious and disappears before mid-summer.
- C.? pustuloides* Beut. Ft. Lee, Lakehurst; galls on red, scarlet, black, scrub and black-jack oak, "Quercus rubra," "coccinea," "velutina," "nana" and "marylandica," IX (Bt).
- C.? racemicola* O. S. Plainfield (Mill); galls among the racemes of golden rods, "Solidago canadensis," "puberula" and "serotina" IX (Bt); Staten Island (Ds).
- C. salicifoliæ* O. S. New Jersey; gall on "Spiræa salicifolia" (Bt).
- C. sanguinolenta* O. S. Ft. Lee district and elsewhere, common; galls on the leaves of hickory VI, VII (Bt); Staten Island (Ds).
- C. serotinæ* O. S. Greenwood Lake, Montclair, Ft. Lee district; gall on twig of wild cherry, "Prunus serotina," V, VI (Bt); Staten Island (Ds).
- C.? triadeni* Beut. Middlesex Co. (Mill); gall on stalk of marsh St. John's-wort, "Triadenum virginicum," IX (Bt).
- C. tubicola* O. S. Common almost everywhere in the State; galls on the leaves of hickory VIII, IX (Bt); Riverton IX (Jn); Jamesburg, Lahaway (Sm).
- C. tulipifera* O. S. Short Hills; galls on the ribs of leaves of tulip tree, "Liriodendron tulipifera," VIII, IX (Bt).
- C. umbellicola* O. S. South Orange, from galls among the umbels of elder, "Sambucus racemosa" (O. S.); Ft. Lee district, on common elder, "S. canadensis," VI (Bt); Staten Island (Ds).
- C. verrucicola* O. S. Little Falls, Staten Island (Ds); Ft. Lee district; galls on leaves of basswood, "Tilia americana," VII-IX (Bt); New Brunswick and frequently elsewhere in the State (Sm).
- C.? vaccinii* O. S. Dover, Morris Plains, Clementon (Jn); galls on the underside of leaves of huckleberry, "Vaccinium stramineum," IX, X (Bt).

- C. viticola** O. S. Ft. Lee district; galls on leaves of wild grape (Bt); Staten Island (Ds); Vincentown (U S Ag).

Family BIBIONIDÆ.

Loose-jointed, ungainly flies of moderate size, with long, stout legs, body often clothed with long hair, antennæ many jointed but short and stout, mouth parts a little produced. There is often considerable difference between the sexes, and in some cases the females have a ridiculously small head. From the very early appearance of some species they are called "March flies," and sometimes they occur in orchards in numbers so great as to attract attention.

The larvæ are cylindrical, footless grubs, and "feed on excremental or vegetable substances, especially on the roots of grass." They have not been, thus far, injurious in New Jersey.

PLECIA Wied.

- P. heteroptera** Say. Caldwell (Cr); Jamesburg (Sm); Lucaston IX, 4, Manumuskin X, 21 (Dke).

BIBIO Geoff.

- B. albipennis** Say. Caldwell (Cr); Newark (Sm); Westville V, 19, Clementon V, 30 (Jn); Manumuskin V, 21 (Dke).
B. pallipes Say. Husted V, 21 (Coll); Jamesburg VII, 4, Riverton V, 1.
B. femorata Wied. Caldwell (Cr); Newark V (Sm); Riverton V, 1 (Jn); National Park V, 6 (Dke).
B. xanthopus Wied. Caldwell (Cr), Riverton IV, 30.
B. longipes Loew. Palisades (Lv); Delair, Riverton, Wenonah, Lucaston, common X, XI (Dke).
B. slossonæ Ckll. (*gracilis* Walk. not Unger.) Clementon X, 11 (Hk).

DILOPHUS Meig.

- D. breviceps** Loew. Toms River V, 30 (Dke); Westville V, 19, Clementon V, 9, VI, 16.

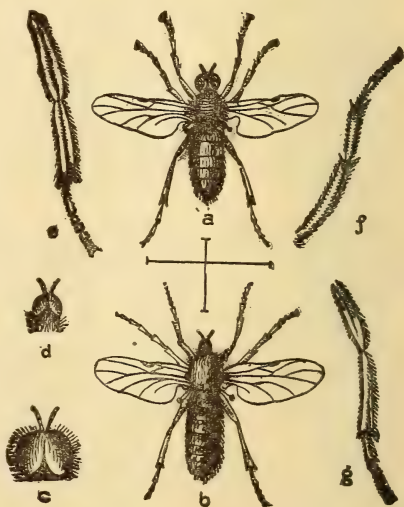


Fig. 301.—*Bibio albipennis*: a, male; c, its head; b, female; d, her head; all enlarged. Other references to structural details.

- D. dimidiatus* Loew. Avalon VI, 8 (Jn); Anglesea V (div); Cape May IX, 21 (Dke).
D. thoracicus Say. Forest Hill IX (Wdt); Blackwood VI, 8 (Jn).

SCATOPSE Geoffroy.

- S. notata* Linn. Clementon V, 9 (Jn); Glassboro V, 19 (Hk).
S. pygmæa Loew. Riverton VII, 31, IX, 9.
S. atrata Say. Riverton IV, 23.

EUPITENUS Macq.

- E. ater* Macq. Riverton IV, 9 (CG).

Family SIMULIDÆ.

Rather undersized chunky flies, known as "black flies," dark in color, the thorax well developed and somewhat produced forward so as to partially conceal the small head from above. Though the head is small in proportion to the insect, the mouth parts are exceedingly well developed and furnished with a formidable array of lancets for puncturing and blood-sucking. The wings are short and broad, the venation obscure except along the front margin.

These flies are horrible pests locally, not so much in our State as in some others west and north, the "buffalo gnat" of the Mississippi Valley region and "black fly" of the north woods being excellent examples.

In New Jersey some species are pests in the Orange Mountains and northward, getting into the ears of horses, or even occasionally of man.

The larvæ are aquatic and live in running water.

SIMULIUM Latr.

- S. venustum* Say. "Black fly"; Del. Water Gap VII, 11, Clementon V, 30 (Jn); Orange Mts., Caldwell VII (Cr); Lucaston IX, 3 (Dke).
S. invenustum Walk. Passaic (U S Ag); Orange Mts. (Sm), Clementon IV, 15 (Jn); Manumuskin IV, 28, Iona IV, 20 (Dke).
S. vittatum Zett. Orange Mts. (Sm).
S. meridionale Riley. Passaic (U S Ag); Riverton VII, 6, X, 20.
S. bracteatum Coq. Clementon V, 30.



Buffalo-gnat.

Fig. 302.

Family RHYPHIDÆ.

These are known as "false crane flies," differing in the smaller size and broader, spotted wings. They often come into houses, and the larvæ live in water, rotten wood or excrementitious matter. They are of no economic importance.

RHYPHUS Latr.

R. alternatus Say. Caldwell (Cr); Morris Plains VI, 25, Riverton III, 20, Clementon V, 30 (Jn); Merchantville VI, 26 (Dke).

R. punctatus Fab. Palisades (Lv); Monmouth County (Sm); Delair X, 5 (Dke); Camden XII, 8 (Kp); Westville (Jn).

R. fenestralis Scop. Camden VIII, 12 (Jn).

Family STRATIOMYIDÆ.

Known as "soldier flies" from their yellow bands and stripes. Usually they are somewhat depressed or even much flattened, especially the abdomen, over which the wings are laid flat and overlapping each other. The mouth parts are developed for lapping only, and the adults are always found among flowers. The antennæ vary in shape, and may be short or of quite moderate length, but always the third joint is compound, and often has an arista.

The larvæ vary greatly in habit, from predatory to feeders upon excrement, living or dead vegetable matter, on land or in water; some of them have been even found in salt or alkaline water.

None are of economic importance.

ALLOGNOSTA O. S.

A. fuscitarsis Say. Caldwell (Cr); Newark VI, 15, Anglesea V, 27 (Jn); New Brunswick (Sm); Trenton V, 21 (Hk).

A. obscuriventris Loew. Culver's Lake V, 29 (Coll); Westville VI, 15 (Jn); Ocean Co. V (Sm); Clementon V, 30 (Hk); Anglesea V, 30 (W).

ACTINA Meigen. (BERIS Latr.)

A. viridis Say. New Brunswick, Ocean Co. (Sm); Ashland V, 30, Clementon V, 30 (Hk).

HERMETIA Latr.

H. illucens Linn. Trenton VII, 7 (Hk).

PTECTICUS Loew.

P. sackeni Will. (testaceus O. S., not Fab.) New Brunswick VIII, 21 (Sm); Dunnfield VII, 15, Riverton VII, 16, Westville VII, 2 (Jn); Brown's Mills VIII, 30, bred from fungus (Dke).

P. trivittatus Say. (similis Will.) Dunnfield VII, 8, Riverton VI, 20, VII, 3, Westville VIII, 8.

GEOSARGUS Bezzi. (SARGUS Fab.)

- G. decorus* Say. Caldwell (Cr); Palisades (Lv); Newark VI, 14, Jamesburg VII, 4 (Jn); Trenton V, 26 (Hk); Riverton VI, 15, Merchantville V, 26 (Dke).
- G. elegans* Loew. Caldwell (Cr).
- G. viridis* Say. Trenton V, 21 (Hk); Clementon V, 30.
- G. cæruleifrons* Johns. Dunnfield VII, 12 (Jn); Riverton VI, 15 (Dke).
- G. cuprarius* Linn. Over fifty specimens of this European species were taken along Second River, near Newark VI, 12-14, 1892 (Jn); one specimen, Caldwell VI, 10, 1892 (Cr).

PEDICELLA Bigot. (MACROSARGUS Bigot.)

- P. clavis* Will. Newark VI (Wdt).

MICROCHRYSA Loew.

- M. polita* Linn. Newark V, Merchantville VII, 19 (Jn); New Brunswick (Sm).

STRATIOMYIA Geoff.

- S. meigenii* Wied. Westville VII, 5, VIII, 8, Anglesea VII, 19.
- S. norma* Wied. Del. Water Gap VII, 15 (Jn); Caldwell (Cr).
- S. discalis* Loew. Elizabeth V, 17 (Kp); Ashland VI, 21 (Hk); Westville VI, 15, Cramer Hill V, 23, Clementon V, 16 (Jn).

ODONTOMYIA Meig.

- O. cincta* Oliv. Palisades VI, 7 (Lv); Avalon VI, 9, Anglesea V, 30, VII, 25, Cape May VI, 14 (Jn).
- O. hieroglyphica* Oliv. Morris Plains VI, 25.
- O. vertebrata* Say. Westville VI, 14, Avalon VI, 30, Anglesea V, 30, VII, 19 (Jn); Ashland VII, 16 (Hk).
- O. virgo* Wied. Westville VII, 12, Merchantville VI, 28 (Jn); Trenton VII, 7, Clementon VI, 25 (Hk).
- O. microstoma* Loew. Atlantic City VII, 15, Anglesea VII, 25, Cape May VI, 22.
- O. flavicornis* Oliv. Caldwell (Cr); Southern New Jersey (Sm).
- O. interrupta* Oliv. Sandy Hook, Westville IV, 26, Clementon V, 10 (Jn); Ashland V, 13 (Hk).
- O. pubescens* Say. Sandy Hook.

EUPARYPHUS Gerst.

- E. tetraspilus* Loew. Boonton VI, 14 (GG).

ADOXOMYIA Kertész. (CLITELLARIA Auct.)

- A. subulata* Loew. Riverton VII, 8.

NEMOTELUS Geoff.**N. carbonarius** Loew. Avalon VI, 8, Anglesea VII, 4, Cape May VI, 14.**N. crassus** Loew. Lenola V, 30.**OXYCERA** Meigen.**O. maculata** Oliv. Merchantville VI, 28, Clementon V, 30, Lenola (Jn); Egg Harbor VII, 10 (Coll).**PACHYGASTER** Meigen.**P. pulcher** Loew. Avalon VII, 22.Family **TABANIDÆ**.

These are moderate or large species, popularly known as "horse-flies," but locally and referring to special types, also as "gad-flies," "deer-flies," "ear-flies," "golden-eyed flies," "strawberry flies," etc. They have short, broad heads, enormous, often gaily colored eyes, flattened abdomen, and short though many-jointed antennæ. The mouth parts consist of a series of sharp, pointed lancets, four in the male, six in the female, inclosed in a soft, fleshy labella or lip. The males live on plant nectar, and do not "bite," but the females attack animals of all kinds and are often a serious annoyance to stock. They frequent woods or the edges of woodland, low meadows or marshy places, and, as Mr. Daecke interestingly shows, the species are often present in very limited areas. They are often troublesome in wood roads, because, with three or four of these flies buzzing about, horses may be driven almost frantic; and so sharp and rigid are the mouth structures that blood appears almost as soon as the insects strike. The species along shore are usually light in color, the eyes green, whence the term "green-heads" that is applied to them. The larger species of "Tabanus" do not often attack man, but the species of "Chrysops" are frequently troublesome in the woods.

In some localities the flies are a serious pest to stock, and in such places much good can be done by collecting the flies. There are also a few animals that are especially liable to attack, and from such the flies can be collected with a small net in such quantities as to materially reduce the supply. As each female fly may lay from 200 to 500 eggs, the effect upon the future generations will be decidedly marked. The attack may be even concentrated on a few gentle animals by treating the others with fish oil soap, to which a little crude carbolio acid has been added.

The larvæ are elongated, somewhat flattened creatures, living in the mud along water courses and in swamps, and they feed upon the organic material found in such places. Clearing and draining will gradually reduce breeding places as the lands are brought under cultivation.

The present list has been prepared by Mr. V. A. E. Daecke, who has made a special study of the species of this family, and in general, when not otherwise credited, the records are his, as are also the changes made in nomenclature from the previous edition.

PANGONIA Latr.

P. pigra O. S. Dunnfield, Del. Water Gap VII, 12 (Jn).

P. rasa Loew. New Hope (Hk).

GONIOPS Aldrich.

G. chrysocoma O. S. Dunnfield, Del. Water Gap VII, 11 (Jn).

CHRYSOPS Meigen.

C. excitans Wlk. Lakehurst VI, 15 (Ds); Toms River V, 30, Bamber V, VI, 3 (Dke).

C. celer O. S. Common everywhere, mid-May to early July.

C. carbonarius Wlk. (*fugax* O. S.) Newark VI, 13, Buena Vista VI, 11, Atco VI, 4 (Jn); Clementon V, 30 (CG); Lacy V, 27, DaCosta VI, 15, common (Dke).

C. mitis O. S. Jamesburg VII, 14 (Hk); Brown's Mills VI, 25 (Dke).

C. cuclux Whitney. Orange Mts. V (Wdt); Trenton VII, 1 (Coll).

C. niger Macq. Common everywhere, V, 12-VII, 4 (Dke).

C. brimleyi Hine. Throughout the pine barrens V, 20-VII, 4 (Dke).

C. amazon Daecke. Brown's Mills, end VI, early VII, rare (Dke).

C. nigrobimbo Whitney. Throughout the pine barrens end VI-IX (Dke).

C. plangens Wied. Passaic VI, 8 (Coll); Newark meadows VI (Wdt); Staten Island VI, 3 (Ds); Atco VI, 4, Avalon VI, Cape May VI, 14 (Jn); Anglesea V, 28 (Dke).

C. fallax O. S. Dunnfield VII, 11, Morris Plains VI, 25, Jamesburg VII, Atco VI, 15, Buena Vista VI, 11 (Jn); Chester VIII, Millburn VII (Coll); Wenonah VI, 22; locally common (Dke).

C. moechus O. S. From all sections of the State VI, 28-VIII, 8.

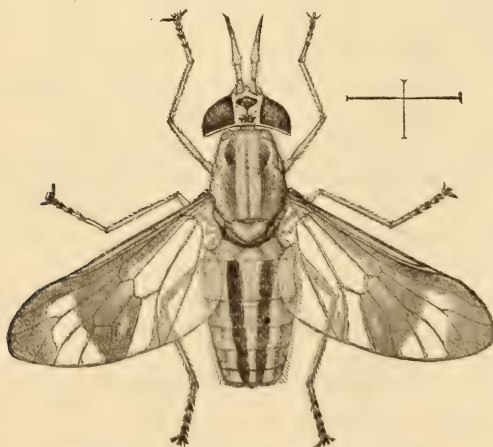


Fig. 303.—*Chrysops univittatus*; enlarged.

C. univittatus Macq. Throughout the State VI, 14-VIII, 23; locally a pest along the edges of woods (Dke).

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- C. bistellatus* Daecke. Birmingham VII, 8 (Hk); Brown's Mills Dist., end VI to mid VII (Dke).
- C. indus* O. S. Trenton VII, 5, Ashland VI, 22, Wenonah VI, 23 (Hk); Clementon V, 10-30 (div); Almonesson V, 20 (W); Brown's Mills V, 27 (Dke).
- C. vittatus* Wied. From all sections of the State VI, 28-IX, 1.
- C. striatus* O. S. Delair VIII, 7, rare (Dke).
- C. sequax* Will. Ashland VII, Clementon IX, 7 (Hk); Wenonah VII, Lucaston IX, 8 (Dke).
- C. lugens* Wied. Trenton VII, 15 (Hk).
var. *morosus* O. S. Trenton VII (div); Newbold VII, 14 (♂) 21 (♀), Bamber VII, 9, Toms River VII, 12 (Dke); Wenonah VI, 23 (Hk); Lake Hopatcong VIII, 6, Lakehurst VIII, 23 (Coll).
- C. parvulus* Daecke. Jamesburg VII, 4 (Hk); Lakehurst (Ds); Bamber VII, 9, Toms River VII, 12 (Dke).
- C. hinei* Daecke. Lakehurst IX, 3-16 (Ds); Atlantic Co. VIII, 7 (Coll); Weymouth VIII, 16, Iona VIII, 25 (Dke).
- C. obsoletus* Wied. Ft. Lee VI, 23, National Park VIII, 13, Wenonah VI, 22 (Dke); Trenton VII, 11 (Hk); Jamesburg VII, 4, Westville VII, 26, Avalon VII, 22 (Jn); Clementon VII, 23 (CG).
- C. delicatulus* O. S. Lakehurst VII, 7 (Coll), Brown's Mills VI, 25, Toms River VII, 12, DaCosta VI, 29, Bamber VII, 9 (Dke).
- C. callidus* O. S. Common everywhere, early V to end of VII.
- C. dimmocki* Hine. Iona VI, 2, Anglesea V, 28, Cape May VI, 7 (Dke).
- C. montanus* O. S. Morris Plains VI, 24, Merchantville VI, 28 (Jn); Trenton VII, 5, 11 (Hk); Clementon VI, 25-VIII, 8 (div).
- C. sackeni* Hine. Paterson VI, 7, Trenton VI, 28 (Coll); Ft. Lee VII, 4, Brown's Mills VI, 17, DaCosta VI, 3 (Dke).
- C. frigidus* O. S. Dover VI, 23 (Jn).
- C. pudicus* O. S. Trenton VII, 11 (Hk); Brown's Mills VI, 27-VII, 1, DaCosta VI, 24 (Dke); Atco VI, 18, Anglesea (Jn).
- C. cursim* Whitney. Jamesburg VII, 4, Clementon VI, 24 (Dke); Lakehurst VI, 16 (Ds); Brown's Mills VII, 1, DaCosta VII, 4 (Dke).
- C. fulvostigma* Hine. Lakehurst VII, 27, one specimen (Ds).
- C. brunneus* Hine. Newark meadows VII (Wdt); Cape May VIII, 9 (Dke).
- C. flavidus* Wied. Linden VII, 16 (Coll), Trenton VII, 5 (Hk); and from all sections south of the Piedmont Plain VI, 29-VIII, 23.

HÆMATOPOTA Meig.

- H. punctulata* Macq. Jamesburg VII, 4 (Jn).

TABANUS Linn. (THERIOPECTUS Zell.)

- T. cinctus* Fab. Jamesburg VII, 4 (Hk); Lakewood (div); Lakehurst VII, 4 (Coll); Brown's Mills VII, 1 (Dke).

- T. lasiophthalmus* Macq. Common throughout south Jersey, less abundant on the Piedmont Plain and northwardly V, 28-VII, 15 (Dke).
- T. trispilus* Wied. Throughout the State VI, 28-VII, 15.
- T. epistates* O. S. Morris Plains VI, 24 (Jn); Glassboro VI, 18 (CG); Sea Isle City V (Luccareni); Cape May VI, 7 (Dke); includes the records under "affinis" Kirby, of last edition.
- T. hinei* Johns. (*politus* Johns.) Type locality Merchantville VI, 28 (Jn); Jamesburg VII, 4 (div); Malaga VII, 20, Brown's Mills VI, 17, 25 (Dke); Clementon VI, 24 (Hk).
- T. recedens* Wlk. (*catenatus* O. S.) Caldwell VI, 15 (Cr); New Brunswick IX, 24 (Coll); Jamesburg VII, 4 (Hk); Merchantville VI, 19 (Kp); Lakewood (Lansing); Brown's Mills VI, 5-21 (Dke); Atlantic Co. VI, 24 (Sm).
- T. exul* O. S. Caldwell (Cr); Orange Mts., Newark VII, 11, New Brunswick VII, 22, Lahaway VII, 17 (Coll); Merchantville VII, 19 (CG).
- T. sulcifrons* Macq. Dunnfield VII (Jn); Boonton VI, 19 (GG); Manumuskine VIII, 26 (Dke).
- T. astutus* O. S. Del. Water Gap VII (Jn); Jamesburg VII, 4 (Hk).
- T. abdominalis* Fab. Caldwell (Cr); Elizabeth VII, 30 (Kp).
- T. molestus* Say. Orange Mts. (Sm).
- T. trimaculatus* Say. Caldwell (Cr); Orange Mts., New Brunswick VII, Lahaway VII, 1 (Coll); Woodbury VI, 4 (Kp).
- T. melanocerus* Wied. Lakewood (Lansing); Brown's Mills VI, 27, VII, 10 (div); Wenonah VII, 15, Bamber VII, 13, Malaga VII, 27 (Dke).
- T. coffeatus* O. S. Common south of the Piedmont Plain V, 15-VIII, 8.
- T. orion* O. S. Caldwell (Cr); Palisades (Love); College Farm (Coll); Atco (Kp).
- T. nivosus* O. S. Type in Coll. A E S is from New Jersey; Riverton VII, 4.
- T. vivax* O. S. Dunnfield VII, 11, 15 (Jn).
- T. longus* O. S. Weymouth VIII, 8 (Dke).
- T. gracilis* Wied. DaCosta VII, 20, Weymouth VIII, 8 (Dke).
- T. pumilus* Macq. From all the faunal regions except the maritime VI, 19-VII, 13, locally common.
- T. sparus* Whitney. Common south of the Piedmont Plain V, 25-VII, 26.
- T. lineola* Fab. Throughout the State VI, 6-IX, 6, more or less common locally; less abundant in the north.
- T. nigrovittatus* Macq. The common green-head of the seashore; abundant from Sandy Hook to Cape May, VI, 20-IX, 2. Extends inland sparingly, and is recorded from New Brunswick VIII, 9 (Coll); Glassboro VIII, 2 (CG).
- T. costalis* Wied. Throughout the State VII, 4-IX, 1.
- T. conterminus* Wlk. Stone Harbor VII, 5 (Dke); 5-mile beach VII, 20 (Hk).
- T. zonalis* Kirby. Greenwood Lake V, 30 (Watson); Prof. Osburn says this is the southernmost record for this species.

- T. fulvulus** Wied. Clementon VII, 11 (Hk); Lakewood (Lansing); Malaga VII, 20 (Dke).
- T. sagax** O. S. Boonton VI, 20 (GG); Jamesburg VII, 4 (Hk); Lakewood (Lansing); Brown's Mills VI, 24, VII, 10 (div); Bamber VIII, 11, Lacy VII, 23 (Dke).
- T. nigrescens** Pal. Beauv. Dunnfield VII, 8, 15 (Jn); Caldwell (Cr); Lahaway VII, 22 (Coll); Brown's Mills VII, 10 (Hk).
- T. superjumentarius** Whitney. Dunnfield VII, 11 (Jn); Jamesburg VII, 4 (div).
- T. stygius** Say. Boonton VI, 20 (GG); Caldwell (Cr); New Brunswick VII, 20 (Sm); Jamesburg VII, 4 (Hk); Riverton VII, 14 (Jn); Camden, Merchantville VII, 19 (CG); Manumuskin VI, 21 (Dke).
- T. atratus** Forst. Throughout the State, more or less common VI & VII. Our largest "horse fly," blue black in color, with a pruinose coating when fresh.

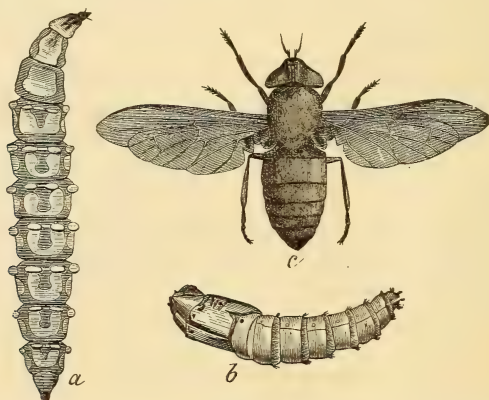


Fig. 304.—*Tabanus atratus*, black horse fly: a, larva; b, pupa; c, adult.

- T. americanus** Forst. Glassboro VII, 1, VIII, 1 (GG); Lakewood (Lansing); Pt. Pleasant, Atlantic City VIII (Stone); Brown's Mills VIII, 4, DaCosta VII, 20 (Dke).
- T. giganteus** DeG. Caldwell (Cr); Ft. Lee VIII, 14 (Dke); Palisades (Lv).
- T. mexicanus** Linn. DaCosta VIII (Bland).
- T. reinwardtii** Wied. Dunnfield VII, 11 (Jn); Caldwell (Cr); New Brunswick (Sm).
- T. typhus** Whitney. DaCosta VI, 4 (Dke).
- T. bicolor** Wied. Orange Mts. VII, 4, Clementon V, 30, Buena Vista VI, 11 (Jn); Collingswood VII, 17 (CG); 2-mile beach VII, 12 (Dke).

Family LEPTIDÆ.

Termed "snipe flies" by Prof. Comstock because of the general form of body in many species. The thorax is rather globular, the abdomen

pointed, the head moderately large, antennæ short, mouth parts prolonged into a beak projecting downward and backward, legs rather long and slender. Some of the species are densely hairy, with contrasting golden yellow and black or brown markings. They are predatory in habit, but rather sluggish in motion. The larvæ are also predatory, and live under widely-varying conditions.

XYLOPHAGUS Meigen.

- X. *persequus* Walk. Caldwell (Cr); Clementon IV, 22 (Dke).
- X. *lugens* Loew. Caldwell (Cr); Palisades IV, under chestnut bark (Lv); Riverton IV, 17 (Jn); Woodbury IV, 29 (Kp).
- X. *abdominalis* Loew. Riverton; the larvæ and pupæ were found beneath the bark of a dead pine III, 20; imagoes emerged IV, 5 and 8 (Jn); Grenloch V, 6 (W).

XYLOMYIA Rond.

- X. *pallipes* Say. New Brunswick VI, 10, Lahaway VII, 6 (Sm); National Park VI, 3, Westville VI, 30 (Dke).
- X. *tenthredinoides* V. d. W. Ft. Lee VI, 23 (Dke); Wenonah VI, 23 (Hk).

DIALYSIS Walker.

- D. *rufithorax* Say. Trenton VII, 3 (Hk); Westville VI, 6, Merchantville VI, 28.
- D. *elongata* Say. Dunnfield VII, 12, Jamesburg VII, 4.

LEPTIS Fab.

- L. *punctipennis* Say. Dover VI, 17, Newark VI, 16, Westville VI, 6, Clementon V, 30.
- L. *plumbea* Say. New Brunswick (Sm).
- L. *mystacea* Macq. Palisades V, 24 (Lv); Dover VI, 18, Woodbury IV, 30, Clementon V, 30 (Jn); New Brunswick (Sm).
- L. *hirta* Loew. Dunnfield, Del. Water Gap VII, 15.
- L. *ochracea* Loew. Dunnfield, Del. Water Gap VII, 8-15.
- L. *scapularis* Loew. "New Jersey" (Bt).

CHRYSOPILA Macq.

- C. *ornata* Say. Dover VI, 18, Newark VI, 16 (Jn); Palisades V, 30 (Lv); Trenton VII, 9 (Coll).
- C. *thoracica* Fab. Dover VI, 17, Newark VI, 13 (Jn); Orange Mts., Anglesea VII, 25 (Sm).
- C. *fasciata* Say. Dunnfield VII, 8, 14, Newark VI, 15, Westville VII, 2 (Jn); Trenton VII, 7 (Hk).
- C. *quadrata* Say. Dunnfield VII, 8, 15, Ft. Lee; Atco VII, 12, Riverton VI, 15, Anglesea VI, 11.

C. propinqua Walk. Mullica Hill, Clementon V, 30, Anglesea VII, 25.

C. basilaris Say. Ft. Lee VII, 4 (Dke); Riverton VII, 3, Westville VIII, 18.

C. rotundipennis Say. Buena Vista VI (Li); Riverton VI, 19, VII, 3 (Jn); Egg Harbor VII, 10 (Coll).

SYMPHOROMYIA Fraun.

S. cinerea Johns. Long Branch VI, 9-12.

Family CYRTIDÆ.

Called "small-headed flies" because of the unusually small head compared with the large hump-backed thorax and inflated abdomen. They are the "Acroceridæ" of previous list, are rare, the larvæ are parasitic upon spiders or their egg sacs, and they are of no economic importance.

ONCODES Latr.

O. costatus Loew. "New Jersey," no data.

O. pallidipennis Loew. Trenton VI, 3 (Hk); Anglesea VI, 20 (Sm).

O. incultus O. S. Boonton VI, 16 (GG); Collingswood VI, 11 (Jn).

OPSEBIUS Costa.

O. pterodontinus O. S. Lakehurst VIII, 18 (Coll); parasitic on "Agalena nævia."

ACROCERA Meigen.

A. fasciata Wied. Philadelphia, bred from "Lycosa stonei," a spider which also occurs in New Jersey.

Family BOMBYLIIDÆ.

These are the "bee-flies," which derive their common name from the fact that they are more or less covered with dense, diverging whitish or yellow hair, giving them a close resemblance to certain bees. Many occur, hovering over bare places in early spring, others are found on flowers, often poised in mid-air between or over them. One series resembles the bumble-bees and has a long pointed proboscis; the other is more slender, the abdomen tending to become flattened, with a short proboscis and much less contrasting colors.

The larvæ are parasitic or partly predatory. Some are true parasites in lepidopterous larvæ; others feed on the egg-pods of grasshoppers while yet others feed in nests of bees, destroying first the bee egg or larva and then feeding upon the food stored for it.

They are never harmful to growing vegetation, hence may be classed as, on the whole, beneficial.

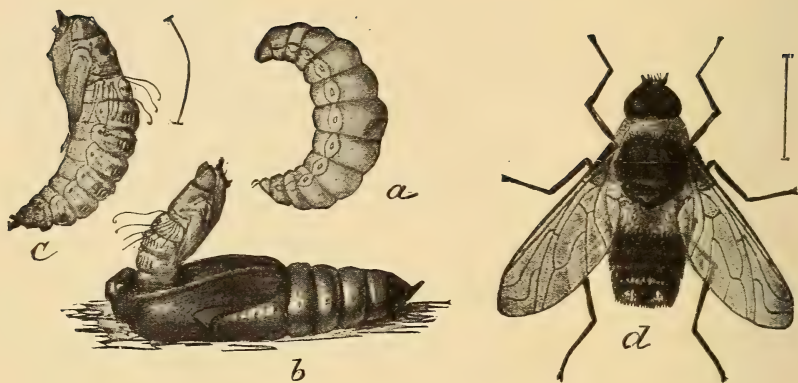


Fig. 305.

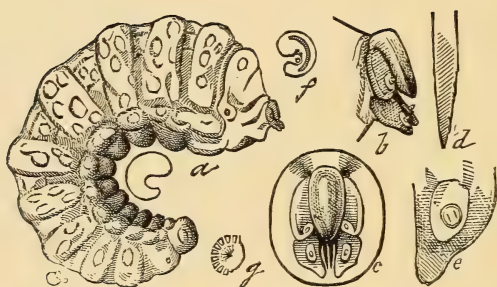


Fig. 307.

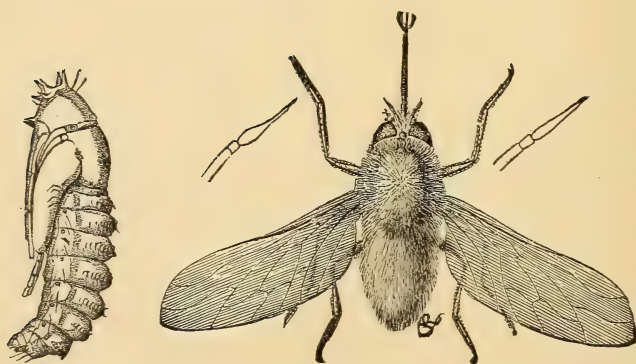


Fig. 306.

Fig. 305.—*Anthrax hippomelas*: a, larva; b, fly pupa projecting from cut-worm pupa; c, pupa; d, adult: all enlarged.

Fig. 306.—Bee-fly, *Systæchus oreas*, parasitic on grasshopper egg-pods, pupa and adult.

Fig. 307.—Larva of *Systæchus oreas* enlarged and details of structure.

SPOGOSTYLUM Macq.

- S. analis* Say. Del. Water Gap VII, 10, Sandy Hook, Anglesea IX, 4 (Jn); Malaga IX, 5 (Hk); Lakewood VIII (Lansing); Atco IX, 1 (Kp); Clementon VIII, 9, Sea Isle VII, 22 (Jn).
- S. albofasciatum* Macq. Westville VIII, 21, Atco VII, 9, Buena Vista VI, 11 (Jn); Clementon VI, VIII (div); Pemberton IX, 1 (Hk); Iona VI, 2 (Dke).
- S. pauper* Loew. Del. Water Gap VII, 10, Westville VIII, 14-23 (Jn); Clementon VI, VIII (div); Pemberton VII, 8 (Hk); Atco IX, 1 (Kp); Anglesea IX, 8 (Dke).
- S. limatula* Say. Riverton IX, 5.
- S. argyropyga* Wied. Dunnfield VII, 11, 15, Riverton VII, 4 (Jn); Trenton VII, 9 (Hk).
- S. oedipus* Fab. Del. Water Gap VII, 12, Westville V, 18, VI, 27, VIII, 23 (Jn); Chester (Dkn); Caldwell (Cr); Lahaway VII, 1 (Coll).
- S. simson* Fab. Boonton VIII, 22, IX, 5 (GG); Caldwell (Cr); Sandy Hook (Bt); Trenton IX, 2, Pemberton IX, 1 (Hk); Westville VIII, 23, Clementon VIII, 7, Atco VII, 8 (Jn).
- S. cephus* Fab. Alpine VII, 12 (Engelhardt).

EXOPROSOPA Macq.

- E. fascipennis* Say. Palisades VII, 26 (Lv); Caldwell (Cr); Westville VIII, 14-23 (Jn); Lakewood VIII (Lansing); Pemberton IX, 1, Lucaston IX, 9 (Hk).
- E. emarginata* Macq. Lakewood VIII (Lansing); Manumuskin VI, 23, VII, 5 (Dke).
- E. fasciata* Macq. Boonton VIII, 19 (GG); Caldwell (Cr); Riverton IX, 9, Malaga IX, 15 (Hk); Westville VIII, 23, IX, 10 (Jn); Lakewood (Lansing); Manumuskin VIII, 26 (Dke).

ANTHRAX Scop.

- A. lateralis* Say. Del. Water Gap VII, 11, Jamesburg VII, 4, Westville VIII, 23, Clementon V, 30, VIII, 9, Anglesea VIII, 15 (Jn); Trenton VII, 9 (Hk).
- var. *gracilis* Macq. Westville VI, 15 (Jn).
- var. *arenicola* Johns. Riverton IV, 30, Clementon V, 16 (Jn).
- A. alternata* Say. Caldwell (Cr); Sandy Hook (Sm); Westville VI, 15, VIII, 23 (Jn); Clementon IX, 5, Brown's Mills VII, 10 (Hk); Manumuskin VI, 24-VII, 5 (Dke).
- A. hypomelas* Macq. Chester (Dkn); Orange Mts. VII, 4, Shiloh IX, 1, Westville IX, 10; Riverton IX, 2 (GG).
- A. fulvohirta* Wied. Caldwell (Cr); Riverton VII, 2, IX, 22 (div); Westville VIII, 28, Clementon VII, 26 (Jn); Malaga VIII, IX (div); DaCosta VII, 20 (Dke).

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- A. tegminipennis* Say. Sandy Hook VIII (Bt).
A. ceyx Loew. Clementon VIII, 6-IX, 7 (div); Lakewood (Lansing); Atco VIII, IX, 8 (GG); Manumuskin VIII, 26-IX, 3 (Dke).
A. sinuosa Wied. Caldwell (Cr); Jamesburg VII, 4, Riverton VI, VII, DaCosta VII, 30, Buena Vista VI, 11 (Jn); Pemberton VII, 8, Brown's Mills VII, 10 (Hk).
A. lepidota O. S. Iona VI, 16 (Dke).
A. faunus Fab. Clementon X, 1 (Hk).

BOMBYLIUS Linn.

- B. major* Linn. Palisades IV, 8 (Lv); Newark V, Westville IV, 9, Clementon IV, 15 (Jn).
B. pygmaeus Fab. Caldwell (Cr); Orange Mts., Jamesburg V, 4 (Sm); South Amboy V, 5 (Kp); Glassboro V, 19 (Hk); Manumuskin IV, 28 (Dke).
B. pulchellus Loew. South Amboy V, 5 (Kp); Jamesburg V, Westville V, 6 (Jn); Glassboro V, 19 (Hk); Hainesport V, 7 (Dke).
B. subvarius Johns. (*lancifer* Johns., not O. S.) Morris Plains VI, 25.
B. fulvibasis Macq. (*atriceps* Loew.) Clementon V, 10, 30 (Jn); Manumuskin V, 12 (Dke).
B. varius Fab. Trenton VII, 3 (Hk); Westville VI, 15, VII, 2, Riverton VI, 17, VII, 3 (Jn); Buena Vista VI, 8 (Li); Clementon VI, 17 (GG).
B. incanus Johns. (*philadelphicus* Macq.) Clementon V, 30, VI, 25, Atco VI, 18, Jamesburg VII, 4 (Jn); Albion VI, 1 (C); Brown's Mills Jr. VI, 22, Iona VI, 2 (Dke).
B. fraudulentus Johns. Dover VI, 25, Morris Plains VI, 24, Orange Mts. VII, 4, Jamesburg VII, 4 (Jn); Iona VI, 2 (Dke).
B. mexicanus Wied. Clementon V, 30, Riverton VI, 9-16 (Jn); Iona VI, 8, Brown's Mills VII, 4 (Dke).

SYSTÆCHUS Loew.

- S. vulgaris* Loew. Pemberton IX, 1 (Hk); DaCosta VII, 19, Clementon VIII, 7-9 (Jn); Lakewood, Burlington Co. (Sm); Iona VIII, 25, Weymouth VIII, 16, Brown's Mills VII, 10 (Dke).

ONCODOCERA Macq.

- O. leucoprocta* Wied. Clementon V, 30, VI, 25, Atco VI, 18 (Jn); Toms River (Edwards); Bamber VII, 13, Manumuskin VII, 5, Iona VII, 13 (Dke).

PTHIRIA Meig.

- P. sulphurea* Loew. Lakewood, Atco VI, 13, 18, Riverton IX, 11 (Jn); Lucaston VIII, 11, Hammonton IX, 6 (Dke).
P. coquilletti Johns. Jamesburg VII, 4, Riverton VII, 4-6.

LEPIDOPHORA Westwood.

- L. ægeriiformis** Westw. Caldwell (Cr); DaCosta VII, 28, Brown's Mills IX, 15 (Dke).

SPARNOPOLIUS Loew.

- S. fulvus** Wied. Chester (Dkn); Riverton IX, 11, Westville VIII, 28 (Jn); Clementon IX, 5 (Hk); Atco IX, 11 (Nell); Belleplain IX, 8, Lucaston IX, 12 (Dke).

ECLIMUS Loew.

- E. niger** Macq. Brown's Mills VI, 15, VI, 23 (Dke).

METACOSMUS Coq.

- M. mancipennis** Coq. Pemberton VII, 11 (CG).

SYSTROPUS Wied.

- S. macer** Loew. Caldwell (Cr); Lakewood (Lansing); Clementon VIII, 9 (Jn); Atco IX, 1 (Kp); Lucaston VII, 27 (GG); Anglesea IX, 8 (Dke).

GERON Meig.

- G. senilis** Fab. Jamesburg VII, 4, Atco VII, 12, Clementon VI, 25, VIII, 7 (Jn); Hammonton IX, 6 (Dke).
G. subauratus Loew. Dunnfield VII, 8, Westville VI, 27 (Jn); DaCosta VII, 19, Brown's Mills VI, 24-VII, 21 (Dke).
G. calva Loew. Dunnfield, Del. Water Gap VII, 11-12.
G. capax Coq. Riverton IV, 30 (Jn); Manumuskin IV, 28 (Dke).

TOXOPHORA Meigen.

- T. amphitea** Walk. Lakehurst VII, 7 (Coll); Buena Vista VI, 11, Atco VI, 18, DaCosta VII, 30 (Jn); Hammonton VIII, 21 Bamber VII, 13, VIII, 11, Manumuskin VI, 23 (Dke).

Family THEREVIDÆ.

Called "stiletto flies" by Comstock, because of their slender, pointed abdomen. They resemble the robber flies, but have longer legs and are more slightly built. They are also predatory, but the lips are broad and fleshy, and they are not nearly so active as the "Asilidæ."

The larvæ are long and slender, the segments constricted so that they seem doubled in number, and they live in mold, fungi, rotten wood and vegetable decay generally, feeding sometimes upon the material among which they are found, sometimes upon such other insects as come in their way.

They can scarcely be said to be beneficial, for the prey of the adult does not usually consist of insects that are harmful to the farmer.

TABUDA Walker.

- T. fulvipes* Walk. Riverton IV, 17, 30, Westville IV, 16, Clementon IV, 15, V, 5 (Jn); Lahaway IV, 20 (Sm); Manumuskin IV, 24-V, 5 (Dke).

PSILOCEPHALA Zett.

- P. hæmorrhoidalis* Macq. Newark VI, 16, Jamesburg VII, 4, Westville, VIII, 13, Shiloh IX, 1, Avalon VI, 9, Cape May VI, 14 (Jn); Pemberton VII, 8, IX, 1 (Hk).
P. morata Coq. Avalon VI, 8, Cape May VI, 14.
P. aldrichii Coq. Jamesburg VII, 4, Riverton VI, 15, Weymouth VIII, 16 (Dke); Westville VII, 12, Stone Harbor VIII, 3.
P. rufiventris Loew. Clementon V, 30, Pleasantville VI, 13 (Lt); Westville VII, 2, Atlantic City VIII, Avalon VI, 9, Anglesea VII, 16.
P. scutellaris Loew. Dunnfield VII, 8, 12, Jamesburg VII, 4.
P. pictipennis Wied. Jamesburg VII, 4 (div); Riverton VII, 3, Atco VI, 18, VII, 9 (Jn); Pemberton VII, 8, Clementon V, 30 (Hk).

THEREVA Latr.

- T. senex* Wlk. Dunnfield VII, 15 (Jn); Boonton VIII, 23 (GG); Caldwell (Cr); Trenton VIII, 11 (Hk).
T. albifrons Say. Riverton V, 14, Clementon V, 6.
T. sp. Toms River V, 30 (Dke).

Family SCENOPINIDÆ.

The "window-flies": small, slight, blue flies, somewhat flattened, and with yellow or red legs. The larvæ are slender and worm-like often found under carpets, where they feed on "moths" and other carpet pests.

SCENOPINUS Latr.

- S. fenestralis* Linn. Caldwell (Cr); New Brunswick (Sm); Riverton, Atco VII, 21 (Jn); Glassboro VII, 5 (CG); DaCosta VII, 20 (Dke); Ashland V, VI (Hk).
S. glabrifrons Meig. New Jersey (Jn).

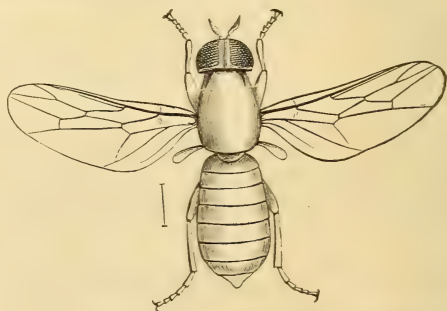


Fig. 308.—The window fly, *Scenopinus fenestralis*: enlarged.

Family MYDAIDÆ.

The "Midas flies," resemble the "Asilidæ" in form and are, like them, predatory. They are much larger, however, with contrasting black and orange colors, the antennæ being long and clubbed at tip. They are practically unimportant.

MYDAS Fab.

- M. clavatus* Drury. Ft. Lee (Bt); Caldwell (Cr); Riverton VII, 3, Da-Costa VII, 30, Anglesea VII, 19 (Jn); Brown's Mills VII, 10 (Hk); Manumuskin VI, 22 (Dke).
M. chrysostoma O. S. (♀ *fulvifrons* Illiger) Stone Harbor VII, 3 (Dke); Avalon VII, 29, Anglesea VII, 19 (Jn).

Family ASILIDÆ.

Head prominent, very hairy, with short, several-jointed antennæ and a short, stout proboscis formed for piercing. The body is robust, hairy, the abdomen long, slender, cylindrical, tapering very gradually to the tip. The wings are long and narrow, the legs moderately long and very powerful, densely clothed with spines, while the tips of the tarsi are supplied with unusually long, stout claws. The insects are called "robber-flies" from their habit of pouncing upon, piercing and sucking the juices of other insects in mid-air while holding them in the grasp of their powerful legs. Some of the species are brightly colored, but most of them are of a sober gray with blackish mottlings. These robber-flies, though predatory, can scarcely be considered of much real value to the farmer, because they take anything that comes along, useful or otherwise, and are just as ready to destroy bees as some harmful species.

The larvæ are also carnivorous so far as known, and live in the ground or in decaying wood.

LEPTOGASTER Meigen.

- L. badius* Loew. Dunnfield VII, 8, Jamesburg VII, 4, Riverton VII, 30.
L. flavipes Loew. Dunnfield VII, 15, Newark VI, 16 (Jn); Trenton VII, 7 (Hk).
L. testaceus Loew. Caldwell (Cr); Westville (Jn).
L. incisularis Loew. Delair VIII, 7 (Dke), Riverton VII, 30, Atco.
L. annulatus Say. (*histrio* Wied.) Princeton VII, 21 (Jn); Trenton VII, 7 (Hk).
L. pictipes Loew. Dunnfield VII, 12, Clementon V, 30, Atco VI, 18 (Jn); Belleplain IX, 8 (Dke).
L. eudicranus Loew. Pemberton VII, 11 (Hk).
L. favillaceus Loew. Newark IV, 14.

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- L. varipes* Loew. Pemberton VII, 11 (Hk); Clementon VIII, 30 (Hk); DaCosta VII, 4, Banber VII, 13 (Dke).
L. carolinensis Schimer (*virgatus* Coq.) Trenton VII, 7 (Hk).

LAPHYSTIA Loew.

- L. sexfasciata* Say. Avalon VII, 29, VIII 2 (Jn); Stone Harbor VII, 5, Cape May VII, 15 (Dke).

CERATURGUS Wied.

- C. aurulentus* Fab. Chester (Coll); Trenton VII, 7 (Hk); Westville VIII, 21 (Jn).
C. cruciatus Say. Dunnfield VII, 8 (Jn); Caldwell (Cr); Dover VII, 16 (Coll); Great Notch VII, 10 (Dke); Trenton VII, 11.

DIOCTRIA Meigen.

- D. albius* Walk. Dunnfield VII, 14, Newark.

CYRTOPOGON Loew.

- C. chrysopogon* Loew. Clementon V, 16.
C. marginalis Loew. Clementon V, 10 (CG); Manumuskin V, 10 (Dke).

LASIOPOGON Loew. (DAULOPOGON Loew.)

- L. opaculus* Loew. New Jersey (A E S); Riverton V, 3, Clementon V, 6 (CG).
L. terricola Johns. Riverton V, 29, Clementon V, 9, Wenonah V, 14 (Jn); Hainesport V, 7 (Dke).
L. tetragrammus Loew. Clementon V, 9, Albion V, 16 (Dke).

HOLCOCEPHALA Jænn.

- H. abdominalis* Say. Dunnfield VII, 9, Princeton VII, 21 (Jn); Trenton VII, 11 (Hk); Cumberland Co. IX, 1 (Sm).
H. calva Loew. Princeton VII, 21 (Jn); Trenton VIII, 11 (Hk); Cumberland Co. IX, 1 (Sm).

HOLOPOGON Loew.

- H. guttula* Wied. Dunnfield VII, 9, Newark VI, 14, Jamesburg VII, 4 (Jn); Clementon V, 30, VI, 25 (div); Brown's Mills VII, 10 (CG); Manumuskin VI, 23 (Dke).

STICHOPOGON Loew.

- S. argenteus* Say. High Point VIII, 5 (Hk); Sandy Hook VIII, Anglesea VII, 22, Avalon VII, 29, VIII, 2 (Jn).
S. trifasciatus Say. Caldwell (Cr); Sandy Hook, Jamesburg VII, 4, Westville VII, 12, Cumberland Co. IX (Jn); Lahaway IX, 26 (Sm); Pemberton IX, 1, Clementon VIII, 15, 5-mile beach VIII, 5 (Hk).

DEROMYIA Philippi.

- D. discolor* Loew. Caldwell (Cr); Merchantville VII, 19 (Kp); Glassboro VIII (CG).

D. umbrina Loew. Dunnfield, Del. Water Gap VII, 14.

D. winthemi Wied. Morristown VII, 18, Lakewood, Atco VII, 12 (Jn); Atlantic Highlands VII, 11 (Lv); Glassboro VIII, 1 (CG); Lucaston IX, 9, Malaga IX, 15 (Hk).

TARACTICUS Loew.

T. octopunctatus Say. Dunnfield VII, 11 (Jn); Trenton VII, 5 (Hk); Clementon VI, 25 (CG); Buena Vista VII, 10 (Li).

NICOCLES Jænn.

N. pictus Loew. Clementon IV, 15.

N. politus Say. Riverton IX, 11, Anglesea IX, 4 (Jn); Clementon IX, 5, X, 4 (Hk); Manumuskine IX, X (Dke).

CEROTAINIA Schiner.

C. macrocera Say. Newark VII, 14, Princeton VII, 21 (Jn); Trenton VII, 8 (Hk); Newbold VII, 14 (Dke).

ATOMOSIA Macq.

A. puella Wied. Caldwell (Cr); Trenton VII, 5 (Hk); Merchantville VI, 29, VII, 19 (Jn).

A. sayii Johns. New Brunswick VIII, 21 (Sm); Laurel Springs VII, 12.

A. glabrata Say. Springfield VIII, 23 (Jn); Trenton VII, 5 (Hk).

POGONOSOMA Rondani.

P. melanoptera Wied. Atlantic Co. XI, 24 (Sm); Malaga VIII, 4 (CG).

DASYLECHIA Will. (HYPERECHIA Schiner.)

D. atrox Will. New Brunswick VIII, 28 (Sm).

LAMPRIA Macq.

L. bicolor Wied. Dunnfield VII, 15 (Jn); Caldwell (Cr).

DASYLLIS Loew.

D. flavicollis Say. Dunnfield VII, 12, Morris Plains VI, 17, 25, Newark VI, 4, Jamesburg VII, 4, Atco VI, 18 (Jn); Brown's Mills VI, 22 (Dke).

D. posticata Say. Dunnfield VII, 11, Jamesburg VII, 4, Westville V, 17, Atco VI, 4 (Jn); Laurel Springs V, 23, bred from decaying pine stump, Manumuskine VI, 24 (Dke).

D. thoracica Fab. Dunnfield VII, 11, Morris Plains VI, 25, Newark VI, 14, Atco VI, 4 (Jn); Trenton VII, 3 (Hk); Westville VI, 6 (CG); Prospertown VI, 7 (Sm).

D. grossa Fab. Dunnfield VII, 11 (Jn); Caldwell (Cr); Jamesburg VII, 4 (Coll); Lakewood (Lansing); Glassboro (CG); Brown's Mills VII, 10 (Hk).

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D. melanopogon Wied. (*affinis* Macq.) Riverton X, 20 (Jn); Malaga IX, 15 (CG); Hammonton IX, 6, Brown's Mills IX, 16, Manumuskin X, 21 (Dke).

D. analis Macq. (*lata* Macq.) Atco VI, 18 (Jn).

LAPHRIA Meig.

L. canis Will. Ft. Lee VI (Lv); Dover VI, 18, Newark VI, 12, Merchantville VI, 25, Clementon V, 30 (Jn); Trenton VII, 11 (Hk); Delair VIII, 14 (Dke).

L. sericea Will. Dunnfield, Del. Water Gap VII, 8-15.

L. æratus Wlk. New Jersey (Jn).

OMMATIUS Illiger.

O. marginellus Fab. (*tibialis* Say.) Dunnfield VII, 15, Morris Plains VI, 24, Westville VII, 5, Shiloh IX, 1, Avalon VII, 23 (Jn); Trenton VII, 11 (Hk); DaCosta VII, 28 (Dke).

PROCTACANTHUS Macq.

P. philadelphicus Macq. Caldwell (Cr); Lahaway IX, 26 (Sm); Riverton VII, 31, VIII, 21, Westville VIII, 28, IX, 13 (Jn); Clementon VIII, 15, Malaga IX, 15 (Hk); Manumskin VI, 22 (Dke).

P. brevipennis Wied. Clementon VI, 6, VII, 4 (div); Lahaway VIII, 3 (Sm); Atco VII, 12, Anglesea VI, 25, VII, 12 (Jn); Manumuskin VI, 22 (Dke).

P. rufus Will. Dunnfield VII, 12, Jamesburg VII, 4, Merchantville VI, 26, Anglesea VII, 19 (Jn); Clementon VII, 9 (Hk); DaCosta VII, 28 (Dke); Avalon VII, 5 (CG).

ERAX Macq.

E. æstuans Linn. (*bastardi* Macq.) Dunnfield VII, 14, Orange Mt. VII, 4, Jamesburg VII, 4, Riverton V, 29 (Jn); Trenton VII, 11 (Hk); DaCosta VII, 28 (Dke).

E. albibarbis Macq. (*cinerascens* Bell.) Jamesburg VII, 4, Westville VIII, 16, Anglesea VII, 9, VIII, 24 (Jn); Pemberton VII, 8 (Hk); Atco VI, 21 (CG); DaCosta VII, 16, Iona VI, 2 (Dke).

E. rufibarbis Macq. (*æstuans* Auct.) Chester (Dn); Malaga IX, 15; Shiloh IX, 1 (Jn); Glassboro, Avalon VIII, 29 (CG); DaCosta VII, 28 (Dke).



Fig. 309.—*Erax æstuans* and its pupa.

MALLOPHORA Macq.

M. clausicella Macq. Pemberton IX, 1 (Hk); Atco VII, 9, DaCosta VII, 30 (Jn); Clementon VII, 26 (CG); Avon IX, 14, Lucaston IX, 2 (Dke).

PROMACHUS Loew.

P. bastardi Macq. New Jersey (A E S).

ASILUS Linné.



Fig. 310.



Fig. 311.



Fig. 312.

Fig. 310.—Silky robber fly, *Asilus sericeus*.

Fig. 311.—Asilid larva.

Fig. 312.—Missouri bee-killer: *Asilus missouriensis*.

- A. sericeus* Say. Ft. Lee VII, 4 (Dke); Caldwell (Cr); Orange Mts. VII, 4, Merchantville VI, 26, Atco VI, 19 (Jn); Trenton VII, 3 (Hk).
- A. cacopilogus* Hine. Atlantic City VII, 15 (Jn); Anglesea (Hk).
- A. fuscatus* Hine. Newark VI, 13, Jamesburg VII, 4 (Hk); Riverton VI, VII (div).
- A. lecythus* Walk. Dover VI, 18, Morris Plains VI, 25, Newark VI, 14.
- A. orphne* Walk. (*distinctus* Will.) Del. Water Gap VII, 8, Dover VI, 17 (Jn); Boonton VI, 8 (GG).
- A. flavofemoratus* Hine. (*flavipes* Will.) Dover VI, 18, Newark VI, 14, Jamesburg VII, 4, Riverton V, 30 (Jn); Trenton V, 25 (Hk).
- A. auricomus* Hine. Iona (Dke); Malaga IX, 15 (CG).
- A. notatus* Wied. Del. Water Gap VII, 15, Newark VI, 14, Clementon V, 30, Anglesea VI, 14 (Jn); Ft. Lee VII, 4 (Dke).
- A. novæ-scotiæ* Macq. Del. Water Gap VII, 14, Orange Mts., Riverton VII, 31, Anglesea IX, 3 (Jn); Manumuskin IX, 15 (Dke).
- A. paropus* Walk. Merchantville VI, 28.
- A. sadyates* Walk. Atco VIII, 9.
- A. snowii* Hine. (*annulatus* Will.) New Jersey (Hine); Trenton V, 25 (Hk).
- A. erythrocnemius* Hine. New Jersey (Hine).
- A. maneei* Hine. Malaga VIII, 4 (CG).

The subgeneric terms for the species of this genus have been omitted, for convenience.

Family DOLICHOPODIDÆ.

Small, usually shining green, sometimes black or yellow flies, with short antennæ, plump body and comparatively long legs, which are often contrasting yellow or brown. The tarsi or feet are unusually long, whence they are called "long-footed flies," and in the male the anterior pair are often flattened or otherwise modified. In the same sex the abdomen is frequently furnished with curiously complex claspers, which are bent down beneath the body. In the female there is usually a pointed, flat ovipositor. They are predatory in habit, feeding chiefly upon smaller flies. The larvæ are long, slender, cylindrical and feed on decaying vegetation.

PSILOPODINUS Bigot. (PSILOPUS Meigen.)

- P. inermis* Loew. Shark River VII, 12, Buena Vista VI, 11, Atlantic City VIII, 11, Avalon VI, 30.
P. caudatus Wied. Great Notch IX, 8 (GG); Merchantville VI, 28, Cape May VI, 14.
P. scobinator Loew. Westville V, 5, Atco VII, 9, Clementon VIII, 6.
P. scaber Loew. Caldwell (Cr); Shark River VII, 12.
P. patibulatus Say. Passaic VI, 8 (Coll); Jamesburg VII, 4, Westville VII, 26, Anglesea VII, 19.
P. siphon Say. Caldwell (Cr); Merchantville VI, 28, Mullica Hill V, 30 (Jn); Glassboro VII, 20 (CG).

AGONOSOMA Guérin. (GRAMPTOSILOPUS Aldrich.)

- A. unifasciatum* Say. (bicolor Loew.) Common, Dunnfield VII, 11, Jamesburg VII, 4, Riverton VII, 3, Clementon VIII, 8, Atco VII, 9.
A. tener Loew. Dunnfield, Del. Water Gap VII, 15.
A. scintillans Loew. Princeton VII, 21, Avalon VI, 30, VII, 29.
A. psittacinum Loew. Avalon VI, 30 (Jn); Anglesea VII, 4 (Lv).
A. variegatus Loew. Avalon VI, 30, Cape May VI, 22.
A. pallens Wied. New Jersey (Bt).

MESORHAGA Schiner. (APTORTHUS Aldrich.)

- M. albiciliata* Aldr. Types at Westville VII, 5, 20, 1891.
M. townsendii Aldr. Atlantic City VIII, 11.

DIAPHORUS Meig.

- D. mundus* Loew. Avalon VII, 22, 29.
P. sodalis Loew. Westville VI, 6.
D. leucostomus Loew. Shark River VII, 12, Riverton IX, 11 (Jn); Anglesea V, 28.
D. opacus Loew. Jamesburg VII, 4, Buena Vista VI, 11.

ASYNDETUS Loew.

- A. ammophilus** Loew. Riverton VII, 30, Westville VIII, 19 (Jn); Egg Harbor VII, 10 (Coll).
A. syntormoides Wheeler. Type taken at Avalon VIII, 22, '94 (Jn); Vineland VII, 29 (Coll).

CHRYBOTUS Meigen.

- C. barbatus** Loew. Trenton VIII, 21 (Hk).
C. obliquus Loew. Jamesburg, Ocean Co. V, Vineland VII, 2, Anglesea V, 28 (Coll).

CAMPICNEMUS Halid.

- C. hirtipes** Loew. Manahawkin IX, 5 (Hk).

ARGYRA Macq.

- A. calcitrans** Loew. Westville VI, 6, Clemneton V, 30, VI, 3.
A. minuta Loew. Dunnfield, Del. Water Gap VII, 15.
A. aldrichi Johns. Long Branch VI, 11.
A. albicans Loew. Princeton VII, 21 (Jn); Riverton VI, 15 (Dke).

LEUCOSTOLA Loew.

- L. cingulata** Loew. Dunnfield VII, 15, Shark River VII, 12, Woodbury VI, 7.

PORPHYROPS Meig.

- P. fumipennis** Loew. Woodbury V, 14.
P. melampus Loew. Westville V, 19, Lenola V, 30.
P. nigricoxa Loew. Lenola V, 30.

NEMATOPROTUS Loew.

- N. venustus** Melander. Westville VI, 6.

SYMPYCNUS Loew.

- S. lineatus** Loew. Princeton VII, 21, Avalon VI, 30.
S. sp. nov. Riverton V, 20.

NOTHOSYMPYCNUS Wheeler.

- N. fortunatus** Wheeler. Dunnfield, Del. Water Gap VII, 11, 13.
N. n. sp. Riverton X, 9.

NEURIGONA Rond.

- N. carbonifer** Loew. (*floridula* Wheeler.) Type taken at Dover VI, 23, '92, Dunnfield VII, 15, Riverton VI, 20.
N. lateralis Say. (*Saucropus superbiens* Loew.) Riverton VII. 3. IX. 11 (Jn); Lucaston V, 30 (CG).
N. rubella Loew. (*Saucropus*) "New Jersey" (Bt); Orange Mts.

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THINOPHILUS Wahlb.

T. neglectus Wheeler. Cape May VI, 6.

MEDETERUS Fischer.

M. princeps Wheeler. Types collected at Farmingdale VII, 14, '97.

M. nigripes Loew. "New Jersey" (A E S).

M. aberrans Wheeler. Avalon VII, 22 (Wheeler).

HYDROPHORUS Fallen.

H. pirata Loew. New Jersey (Bt).

H. glaber Walk. Manahawkin IX, 5 (Hk).

H. viridiflos Walk. Atlantic City V, 6.

H. æstuum Loew. Avalon VIII, 8 (Hk).

LIANCALUS Loew.

L. gensualis Loew. "New Jersey" (Bt).

DOLICHOPUS Latr.

D. johnsoni Aldr. Type taken at Jamesburg VII, 4, 1891.

D. gratus Loew. Palisades (O S); Dunnfield VII, 8.

D. calcaratus Aldr. Type at Dover VI, 18, '92, Dunnfield VII, 8.

D. setifer Loew. Passaic VI, 8 (Coll); Riverton IX, 9, Westville V, 19, Clementon V, 16.

D. acuminatus Loew. Westville V, 19, Clementon V, 30.

D. albicoxa Aldr. Clementon V, 30, Anglesea V, 28 (Jn); Burlington and Ocean Cos. V (Sm).

D. palæstricus Loew. Dover VI, 18.

D. scapularis Loew. Iona IX, 12 (CG).

D. tonsus Loew. Clementon V, 30.

D. variabilis Loew. Dunnfield VII, 14, Westville VIII, 14.

D. cuprinus Wied. Dover VI, 16, Jamesburg VII, 4, Merchantville VI, 28.

D. virga Coq. Manahawkin IX, 5 (Hk).

D. longipennis Loew. Dunnfield VII, 11, Merchantville VI, 28.

D. ramifer Loew. Monmouth Co. VII, 31, Avalon VII, 22.

D. pugil Loew. (henshawii Wheeler.) Cape May VI, 23 (Vk).

D. cornutus Loew. Newark VI, 16, Riverton IX, 11, Westville V, 19, VII, 5, Avalon VII, 22, Anglesea V, 25.

D. lobatus Loew. Dunnfield, Del. Water Gap VII, 15.

D. scoparius Loew. Dover VI, 23.

D. quadrilamellatus Loew. Palisades VI (O S).

D. funditor Loew. Merchantville VI, 28.

D. incisuralis Loew. Merchantville VI, 28.

- D. albiciliatus* Loew. Dover VI, 23.
D. bifractus Loew. Jamesburg VII, 4, Ocean Co. (Sm); Westville VIII, 18.
D. eudactylus Loew. Riverton VII, 3, Woodbury VI, 7.
D. vittatus Loew. Princeton VII, 21.
D. batillifer Loew. New Jersey (Bt).
D. reflectus Ald. Lenola V, 30, Jamesburg VII, 4 (Jn).
D. comatus Loew. Trenton VI, 1 (Coll); Jamesburg, Anglesea V, 28.
D. myosota O. S. Trenton VIII, 21 (Hk).

GYMNOPTERNUS Loew.

- G. flavus* Loew. Dunnfield VII, 8, Dover VII, 16, Westville VII, 21.
G. spectabilis Loew. Westville V, 19, Clementon V, 30.
G. scotias Loew. Shark River VII, 12.
G. ventralis Loew. Shark River VII, 12.
G. debilis Loew. Jamesburg VII, 4, Merchantville VI, 28.
G. barbatulus Loew. Westville VI, 18.
G. exilis Loew. Merchantville VI, 28, Avalon VI, 30.
G. lunifer Loew. Ocean Co. V (Sm).
G. albiceps Loew. Manahawkin IX, 5 (Hk).
G. subdilatus Loew. Delaware Water Gap VII, 8.
G. humilis Loew. Boonton VI, 2 (CG); Ocean Co. (Sm).

HERCOSTOMUS Loew.

- H. vetitus* Melander. Clementon V, 30.

TACHYTRECHUS Stannius.

- T. vorax* Loew. Westville VIII, 18 (Jn); Clementon V, 10 (CG).
T. protervus Melander. Clementon V, 10.
T. binodatus Loew. Durham Pond, Morris Co. VIII, 18 (GG).
T. junctus Coq. Manahawkin IX, 5 (Hk).

PELASTONEURUS Loew.

- P. vagans* Loew. Princeton VII, 21, Clementon V, 30.
P. lugubris Loew. Cape May VI, 22.
P. lamellatus Loew. Jersey City IX, 18, Brigantine VIII, 3.
P. lætus Loew. Trenton VIII, 21 (Hk).

Family EMPIDÆ.

The "dance-flies," so called because of their habit of congregating in swarms under trees or near shrubs and about brooks, dancing up and down. The mouth parts are often prolonged into a beak, and they are

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predatory in habit. The larvæ are predatory, and live under leaves and other decaying vegetable matter, where their prey occurs.

PLATYPALPUS Macq.

- P. æqualis* Loew. Dunnfield VII, 14, Merchantville VI, 28, Clementon VI, 16 (Jn); Trenton V, 20 (Hk).
P. mesogramma Loew. Dunnfield VII, 8, 15, Merchantville VI, 28. Westville VII, 21.
P. trivialis Loew. Trenton V, 13 (Hk).
P. pachynema Loew. Westville VI, 6, Clementon V, 9, 16.
P. lateralis Loew. Trenton VII, 25.

TACHYDROMIA Meig.

- T. fenestrata* Say. Boonton IX, 5, Clementon V, 2 (GG).
T. pusilla Loew. Riverton V, 1, Clementon V, 9.
T. brachialis Melander. Boonton IX, 9 (CG).

HEMERODROMIA Meig.

- H. empiformis* Say. Dunnfield VII, 11 (Jn); Trenton V, 20 (Hk).
H. defecta Loew. Avalon VI, 9.
H. capta Coq. Boonton IX, 5-9 (CG).
H. scapularis Loew. Clementon V, 16, 30.

LITANOMYIA Melander.

- L. elongata* Melander. Avalon VI, 9.

CHIROMANTIS Rond.

- C. vocatoria* Fall. Delaware Water Gap VII, 12.

SYNECHES Walk.

- S. thoracicus* Say. Ft. Lee VII, 4 (Dke); Jamesburg VII, 4, Merchantville VI, 28, Atco VII, 12.
S. simplex Walk. Westville VII, 2, Atco VI, 18, Avalon VII, 22 (Jn); Clementon VI, VIII (div); 5-mile beach (Hk).
S. rufus Loew. Ft. Lee VII, 4 (Dke); Atco VII, 9, Avalon VI, 30 (Jn); Buena Vista VII, 10 (Li).
S. hyalinus Coq. Westville VII, 21, Avalon VII, 22 (Jn); Malaga VIII, 4 (GG); Bamber VII, 13 (Dke).
S. pusillus Loew. Jamesburg VII, 4 (Jn); Trenton VII, 7, Riverton VI, 27 (Hk).

SYNDYAS Loew.

- S. polita* Loew. Riverton VII, 18 (CG); Manahawkin IX, 5 (Hk); Buena Vista VI, 11, Brown's Mills VI, 25 (Dke).
S. dorsalis Loew. Lucaston IX, 3 (Dke).

HYBOS Meig. (EUHYBUS Coq.)

- H. triplex* Walk. Chester IX, 9 (Coll); Westville V, 30, Clementon V, 22, Mullica Hill, Atlantic City V, 15, Anglesea V, 28 (Jn); Ashland VII, 15 (Hk).
H. subjectus Walk. Jamesburg VII, 4, Riverton IX, 9, Clementon V, 30, Atco VII, 12, Avalon VII, 22.
H. slossonæ Coq. Del. Water Gap VII, 14, Riverton VIII, 11, Atco VI, 12.
H. reversus Walk. Del. Water Gap VII, 12, Jamesburg VII, 4.

OEDALEA Meig.

- O. ohiensis* Melander. (*stigmatella*?) Newark VI, 13.

LEPTOPEZA Macq.

- L. flavipes* Meig. Dover VI, 18.
L. compta Coq. Riverton VI, 20 (Jn); National Park V, 6, Newbold VI, 30 (Dke).

PACHYMERIA Stephens.

- P. pudica* Loew. Great Notch V, 4 (Dke).

EMPIS Linn.

- E. spectabilis* Loew. Caldwell (Cr); Riverton V, 1, Wenonah V, 14, Clementon IV, 15.
E. longipes Loew. "New Jersey" (OS).
E. loripedis Coq. Palisades V, 24 (Lv); Clementon V, 9 (Jn).
E. tridentata Coq. Woodbury VI, 7.
E. humilis Coq. Great Notch V, 4 (Dke).

HILARA Meigen.

- H. testacea* Loew. Clementon V, 9.
H. lutea Loew. Clementon V, 10, 30.
H. leucoptera Loew. Avalon VI, 9.
H. macroptera Loew. Riverton VI, 20 (Hk).
H. mutabilis Loew. Clementon V, 10, Avalon VI, 9.
H. femorata Loew. Pemberton V, 10 (Hk); Avalon VI, 8.
H. tristis Loew. Dover VII, 17.
H. umbrosa Loew. Clementon VI, 2.
H. gracilis Loew. Dunnfield VII, 12 (Jn); Brown's Mills VI, 22 (Dke).
H. seriata Loew. Clementon V, 26.
H. trivittata Loew. Ashland V, 13 (Hk).

GLOMA Meigen.

- G. n. sp.* Clementon V, 30.

RHAMPHOMYIA Meigen.

- R. longicauda* Loew. Dunnfield, Del. Water Gap VII, 12.
R. tersa Coq. Prospertown VI, 1 (Sm).
R. priapulus Loew. Clementon V, 9.
R. gracilis Loew. Dunnfield, Del. Water Gap VII, 11.
R. glabra Loew. Caldwell (Cr); Newark VI, 16 (Jn); Trenton VII, 7 (Hk).
R. compta Coq. Clementon VI, 16.
R. basalis Loew. Clementon V, 9.
R. nana Loew. Del. Water Gap VII, 10, Clementon V, 10 (Jn); Riverton IV, 26 (CG).
R. pulla Loew. Clementon V, 30 (Jn); Atco VI, 3 (Li); Wenonah V, 30, Merchantville V, 26 (Dke).
R. angustipennis Loew. Trenton V, 20 (Hk); Clementon V, 9, 30 (Jn); Brown's Mills V, 21 (Dke).
R. vittata Loew. Clementon V, 30.
R. luteiventris Loew. Morris Plains VI, 24, Clementon VI, 3 (Jn); Brown's Mills V, 21 (Dke).
R. minutus Walk. Dover VI, 17.
R. limbata Loew. Clementon V, 9, 10.
R. candicans Loew. Morris Plains VI, 24, Clementon V, 30, Avalon VI, 9.
R. manca Coq. Riverton VI, 19, VII, 3, Clementon V, 9 (Jn); Brown's Mills V, 13 (Dke); Glassboro V, 19 (Hk).
R. pulchra Loew. Westville VI, 6 (Jn); Lahaway VII, 12 (Sm).
R. pusio Loew. Riverton V, 1 (Jn); Brown's Mills V, 12 (Dke).
R. polita Loew. Culver's Lake V, 29 (Coll); Riverton V, 29.
R. vara Loew. Newark V (Sm).
R. leucoptera Loew. Riverton IV, 11, 30 (Jn); Lucaston IV, 10 (Dke).
R. scolopacea Say. Dunnfield, Del. Water Gap VII, 15.
R. clauda Coq. Clementon V, 10.
R. diversa Coq. Clementon V, 9, 10.
R. macilenta Loew. Dunnfield VII, 11 (Jn); Lahaway VII, 5 (Sm).
R. irregularis Loew. Riverton IV, 20 (Jn); Iona IV, 21 (Dke).
R. mutabilis Loew. New Brunswick VI, 7 (Sm); Clementon V, 10, Wenonah V, 14.
R. sordida Loew. Clementon V, 10.
R. umbrosa Loew. Boonton VI, 6 (CG).
R. brevis Loew. Iona IV, 20 (Dke).
R. amplipedis Coq. Brown's Mills V, 12 (Dke).
R. aperta Loew. Iona IV, 21 (Dke).
R. otiosa Coq. Fort Lee VII, 4 (Dke).
R. exigua Loew. Iona V, 16 (Hk).
R. rustica Loew. Riverton VI, 13 (Hk).

Family LONCHOPTERIDÆ.

The "spear-winged" flies, characterized by the pointed wings that induced the common name. They occur near water courses, and little is known of them or their habits. Only two species have been collected in New Jersey.

LONCHOPTERA Meig.

- L. lutea* Panz. New Brunswick VII, 20 (Sm); Westville VII, 4, Anglesea VII, 19 (Jn).
L. riparia Meig. Ocean Co. V (Sm); Manumuskin X, 20 (Dke).

Family PHORIDÆ.

Small, hunch-back flies, with large, broad wings, often observed running about on fallen leaves, windows, etc. The larvæ are cylindrical, thinner in front than behind, and live in dead snails, insects, decaying fungi, vegetables, etc., and possibly in living insects.

HYPOCERA Lioy.

- H. johnsoni* Brues. Riverton VIII, 31.
H. clavata Loew. National Park V, 6 (Dke); Clementon X, 3 (CG); Pemberton V, 10 (Hk).

APHIOCHÆTA Brues (PHORA).

- A. rufipes* Meig. Del. Water Gap VII, 12, Riverton V, 23 (Jn); Stelton VI, 21 (Coll).
A. fasciata Fall. Delaware Water Gap VII, 8.
A. picta Schiner. (*interrupta* Zett). Del. Water Gap VII, 8, 12.
A. nigriceps Loew. Del. Water Gap VII, 12, Shark River VII, 12 (Jn); Ocean Co. V (Sm).
A. albidihalteris Felt. Types bred from mushrooms, New Brunswick (Sm).
A. fungicola Coq. Del. Water Gap VII, 12, Clementon V, 9.
A. agarici Lint. Fort Lee (Lv).
A. scalaris Loew. Del. Water Gap VII, 12 (Jn); New Brunswick VIII, 7 (Coll); Lucaston IX, 28 (Dke).
A. epeiræ Brues. Dunnfield VII, 18, Avalon VI, 9.
A. flava Fallen. "New Jersey."
A. atlantica Brues. Atco.
A. minuta Aldr. Boonton I, 15 (GG).
A. microcephala Loew. Trenton IV, 19 (Hk).

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TRINEURA Meig.

T. aterrima Fab. Del. Water Gap VII, 8, Riverton V, 14, Clementon V, 9

CONICERA Meig.

C. atra Meig. Dunnfield VII, 8, Newark VI, 14.

GYMNOPHORA Macq.

G. arcuata Meig. New Jersey.

Family PLATYPEZIDÆ.

Termed "flat-footed" flies because in the males the posterior tarsi are broad and much flattened. They are smaller than, but resemble a house-fly, and occur in swarms near water courses, though locally. The larvæ live in mushrooms, and are not of economic importance.

AGATHOMYIA Verrall.

A. notata Loew. (*Callomyia tenera* Loew.) Riverton VII, 23, Westville VII, 2, 21 (Jn); "New Jersey" IV (A E S).

PLATYPEZA Meigen.

P. velutina Loew. Dunnfield VII, 11, Riverton VII, 30.

P. anthrax Loew. National Park VI, 3 (Dke).

P. tæniata Snow. Clementon IX, 9, X 3 (CG).

Family PIPUNCULIDÆ.

The "big-eyed" flies of Comstock, so called because of their relatively enormous head, which is made up almost entirely of eyes. The species are rare, and little is known of the larvæ, save that they are parasitic on bugs.

CHALARUS Wik.

C. spurius Fall. Del. Water Gap VII, 12 (Jn); Bamber VII, 13 (Dke).

NEPHROCERUS Zett.

N. dæcke Johns. Forest Hill (Wdt).

PIPUNCULUS Latr.

P. albofasciatus Hough. Westville VII, 2.

P. similis Hough. Westville VIII, 13.

P. atlanticus Hough. Newark VI, 14, Riverton VI, 18, Clementon V, 17 (Jn); Brown's Mills VII, 4 (Dke).

- P. subvirescens* Loew. Riverton VI, VII (Jn); Delair VIII, 14 (Dke).
P. nigripes Loew. Newark IX (Wdt); Clementon X, 4 (Hk); Buena Vista VI, 10 (Jn).
P. nitidiventris Loew. Trenton V, 20 (Hk); Riverton IX, 14 (Jn).
P. subopacus Loew. Newark VII (Wdt); Riverton VI, 1, VII, 19 (Jn), Clementon V, 30 (Hk).
P. pallipes Johns. Trenton VIII, 21 (Hk); Wildwood VIII, 27.
P. fuscus Loew. Trenton VII, 7, Wenonah VI, 23 (Hk).
P. cingulata Loew. Forest Hill (Wdt).
P. houghi Kertész. Trenton V, 24 (Hk); Brown's Mills, V, 13.

Family SYRPHIDÆ.

These are "flower-flies," usually brightly colored and banded with yellow on a black, bronze or blue ground. They have very short, aristate or stylate three-jointed feelers, barrel-shaped bodies, and somewhat flattened abdomen, varying from slender to broadly oval. Sometimes they are almost bare and resemble wasps in appearance and habits; at others they are hairy and resemble bees, even in the droning or buzzing noise that they make. The mouth parts are formed for scraping and lapping only, and they feed upon honey or pollen.

In larval habits they vary greatly. Some are predatory and feed upon plant lice; these are usually wrinkled, pointed anteriorly, and live among their prey upon leaves of plants. Others feed in plant tissue, being more or less maggot or grub-like; and yet others are scavengers, the larvæ feeding in the foulest excrementitious matter; these are usually furnished with a long breathing tube from the anal end, and are known as rat-tailed larvæ. Some few species seem to feed upon pollen, and at least one form occurs between the leaf and stalk of corn, feeding upon the juices. Yet on the whole the species are beneficial.



Fig. 313.—A "rat-tailed" larva.

MICRODON Meig.

- M. globosus* Fab. Riverton IX, 14, Westville VII, 2, IX, 10, Anglesea IX, 4 (Jn); Pemberton VII, 8 (Hk); DaCosta VII, 1-16 (Dke); Cape May VII, 31 (Vk).
M. megalogaster Snow. Clementon V, 30 (Jn); Wenonah VI, 23 (Hk).
M. tristis Loew. Ft. Lee (Osburn); Dover VI, 17, Newark VI, 14, Clementon V, 9 (Jn); Brown's Mills VI, 22 (Dke).
M. aurifex Wied. Forked River Mts. VII, 9 (Fenninger).
M. rufipes Macq. Lakehurst VII, 7.

MIXOGASTER Macq.

- M. breviventris* Kahl. Lucaston VIII, 27, IX, 14 (Dke).

CALLICERA Meig.

- C. johnsoni* Hunt. Glassboro IV, 29 (CG); Manumuskin IV, 28 (Dke).

CHRYSOTOXUM Meigen.

- C. laterale* Loew. Westville IX, 10 (Jn); Clementon V, 30, X, 4 (Hk).
C. pubescens Loew. Caldwell VI, 15 (Cr); Westfield (Bueno); New Brunswick (Sm); Woodbury IV, 2 (Jn); Clementon IX, 7 (Hk); Atco IX, 19 (CG).
C. derivatum Walk. Riverton IX, 8, 14.

CHRYSOGASTER Meig.

- C. nigripes* Loew. Orange (Loew); Morris Plains VI, 25, Riverton V, 10, Westville VI, 15 (Jn); New Brunswick (Sm); Bridgeport V, 20 (Dke); Trenton V, 21, Clementon V, 30 (Hk).
C. nitida Wied. Ft. Lee (Osburn); Trenton VII, 3, Clementon IX, 5 (Hk); Jamesburg VII, 15, Westville V, 19, Anglesea VII, 19, Bridgeport V, 20 (Dke).
C. pictipennis Loew. Riverton IV, 26 (CG); Clementon V, 9, Lenola V, 30.
C. pulchella Will. New Brunswick V, 24 (Sm); Jamesburg VII (Jn); Ashland VII, 16 (Hk).

PSILOTA Meig.

- P. buccata* Macq. Clementon V, 3 (Hk); Manumuskin IV, 28, Iona IV, 30 (Dke).

PIPIZA Fall.

- P. modesta* Loew. Delair X, 19 (Dke); Atco VII, 9, Clementon V, 30.

- P. radicum* Walsh & Riley. (*positica* Will.) Newark VI, 14, Riverton VIII, 14, Clementon V, 30 (Jn); Wenonah VI, 23 (Hk).

- P. pulchella* Will. Trenton V, 26 (Hk); Lucaston V, 28 (Dke); Sandy Hook VIII, 11, Avalon VI, 9, Wildwood VIII, 12, Cape May VI, 3.

- P. calcarata* Loew. Dunnfield VII, 12, Riverton VII, 4.

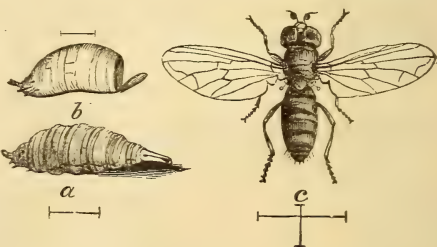


Fig. 314.—*Pipiza radicum*; a root-louse Syrphid: a, larva; b, pupa; c, adult: all enlarged.

PARAGUS Latr.

- P. angustifrons* Loew. Jamesburg VII, 15, Westville VI, 15, Atco VII, 12, Anglesea VII, 19 (Jn); Ashland VII, 16 (Hk).

P. bicolor Fab. Ft. Lee (Osburn); Princeton VII, 21 (Jn); Clementon X, 4 (Hk).

P. tibialis Fall. Ft. Lee (Osburn); Orange Mt. VIII, 29 (Coll); Dover VI, 23, Jamesburg VII, 4, Clementon VIII, 6, Atco VI, 4 (Jn); Trenton IX, 12 (Hk).

CHILOSIA Meig.

C. similis Coq. Riverton IX, 20; Lucaston IX, 8, Clementon IX, 8 (Jn); Iona IX, 12 (CG).

C. pallipes Loew. Dunnfield VII, 11, 15, Caldwell VI, 15 (Jn); Paterson V, 3 (Osburn); Delair VIII, 18 (Dæcke).

C. capillata Loew. Clementon V, 9.

C. tristis Loew. Riverton IX, 11 (CG); Clementon IX, 5, X, 4 (Hk); Hammonton IX, 6, Bamber IX, 9, Manumuskin IX, 15, X, 8 (Dke).

C. comosa Loew. Garrett Rock, Paterson V, 3 (Osburn); Clementon IV, 21 (Dke).

MYIOLEPTA Newman.

M. varipes Loew. Clementon VI, 2 (Dke).

BACCHA Fab.

B. tarchetius Walk. Riverton IX, 9 (CG); Westville, VIII, 28 (Jn); Clementon XII (Hk); Weymouth VIII, 16 (Dke).

B. clavata Fab. Riverton IX, 11, Avalon VI, 9.

B. lugens Loew. Manumuskin X, 8 (Dke).

B. fascipennis Wied. (*aurinota* Harris.) Trenton IX, 3, Riverton IX, 9 (Hk); Ocean Co., Cumberland Co. IX, 1 (Sm).

B. cognata Loew. Dunnfield, Del. Water Gap VII, 11.



Fig. 315. — *Syrphus* larva eating a plant-louse.

OCYPTAMUS Macq.

O. fuscipennis Say. Trenton VII, 11 (Hk); Westville VII, 4, VIII, 14, Clementon VIII, 9 (Jn); Lakewood (Lansing).

PYROPHÆNA Schr.

P. rosarum Fab. Delaware Water Gap VII, 15.

PLATYCHIRUS St. Farg. & Serv.

P. quadratus Say. Palisades VII, 10 (Lv); Jamesburg VII, 4, 15, Westville V, 19, VIII, 23 (Jn); Trenton VII, 5, Clementon V, 30 (Hk).

P. hyperboreus Stæger. Caldwell (Cr); Ft. Lee (Osburn); Elizabeth V, 6 (Kp); Jamesburg VII, 4 (Jn); Clementon V, 30 (Hk).

P. peltatus Meig. Merchantville V, 26 (Dke).

P. chætopodus Will. Ft. Lee (Osburn).

MELANOSTOMA Schiner.

M. obscurum Say. Caldwell (Cr); Ft. Lee (Osburn); Riverton IV, 26 (CG); Westville VI, 15, IX, 10 (Jn).

M. mellinum Linn. Caldwell (Cr); Ft. Lee (Osburn); New Brunswick (Sm); Jamesburg VII, 4, Westville V, 19 (Jn); Trenton V, 21, Clementon V, 30 (Hk).

DIDEA Macq.

D. fasciata Macq. (*fuscipes* Loew.) Jamesburg, Westville VIII, 21, Clementon V, 16, Ocean Co. V, 18 (Jn); Delair X, 19, Iona IV, 30 (Dke).

SYRPHUS Fab.

S. arcuatus Fall. New Brunswick V, 3 (Sm); Camden IX, 14, Westville IV, 16 (Kp); Clementon X, 1 (Hk).

S. perplexus Osburn. New Jersey (Osburn).

S. ribesii Linn. Newark VI, 14, Westville VIII, 14, Cumberland Co. IX, 1.



Fig. 316.

Fig. 316.—*Syrphus torvus*: much enlarged.

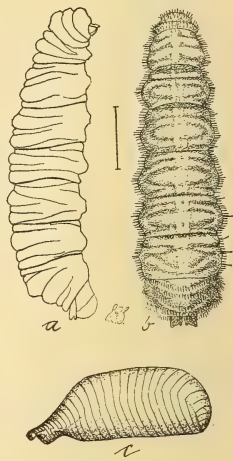


Fig. 317.

Fig. 317.—Larva *a* and *b*, pupa *c*, of *Syrphus torvus*: much enlarged.

S. torvus O. S. Caldwell (Cr); Camden V, 26 (CG); Westville IX, 13 (Jn); Prospertown, common in Monmouth and Burlington Cos., feeding on the wheat-louse; the species of this genus are usually feeders upon plant-lice (Sm).

S. grossulariæ Meig. (*lesueurii* Macq.) Dunnfield VII, 14, Atco VI, 13 (Jn); New Brunswick VII, 9, Prospertown VI, 6 (Sm); Anglesea V, 31 (Brn).

- S. amalopis* O. S. Paterson V, 3 (Osburn).
S. diversipes Macq. Paterson V, 3 (Osburn).
S. americanus Wied. Del. Water Gap VII, 12, New Brunswick VI, 1 (Sm);
 Trenton V, 21 (Hk); Westville VI, 26, IX, 13, Merchantville VI, 28
 (Jn).
S. umbellatarum O. S. Riverton VII, 30 (Jn); Pemberton VII, 11 (CG).
S. abbreviatus Zett. Ft. Lee (Osburn); Clementon V, 11 (CG).
S. pyrostri Linn. Garret Rock, Paterson V, 18; the first eastern record
 for this European species (Osburn).
S. xanthostomus Will. Ft. Lee (Osburn); Westfield (Bno); Lakehurst
 (Ds).

ALLOGRAPTA O. S.

- A. obliqua* Say. Caldwell (Cr); Highlands VII, 11, Riverton IX, 5, West-
 ville VI, 27, Atlantic City VII, 15 (Jn); Pemberton VII, 8, Clementon
 IX, 5 (Hk).

XANTHOGRAMMA Schiner.

- X. emarginata* Say. Riverton IX, 20 (CG); Westville (Jn); Clementon
 IX, 5 (Hk); Lakehurst (Ds).
X. flavipes Loew. Morris Plains VI, 25, Newark VI, 16 (Jn); Palisades
 (Ds); Trenton VII, 5 (Hk).
X. æqualis Loew. Clementon V, 9, 10 (div); Malaga V, 1 (Hk).
X. habilis Snow. Clementon IX, 11 (CG); heretofore regarded as western.

MESOGRAMMA Loew.

- M. polita* Say. Caldwell (Cr); Sandy Hook VIII, 17, Riverton IX, 5,
 Gloucester VIII, 14 (Jn); Trenton IX, 2, Clementon VII, 5 (Hk); this
 species is sometimes a corn pollen feeder in the larval stage, and
 occurred in large numbers in the summer of 1899 between the leaves
 and stalk of corn in Atlantic County.
M. marginata Say. Common throughout the State VI to X.
M. geminata Say. Ft. Lee (Osburn); Riverton IX, 5, Westville VI, 27,
 Clementon VIII, 9 (Jn); Ashland V, 13, Clementon IX, 5 (Hk).
M. boscii Macq. Avalon VII, 22.

SPHÆROPHORIA St. Farg. & Serv.

- S. cylindrica* Say. Common throughout the State V to IX.

PELECOCERA Meig.

- P. pergandei* Will. Riverton IX, 20 (CG); Lucaston IX, 28 (Dke).

SPHEGINA Meig.

- S. keeniana* Will. Clementon V, 16, VI, 7.

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S. lobata Loew. Dunnfield VII, 8, 15, Riverton VI, 19 (Jn); Clementon V, 30 (CG).

S. rufiventris Loew. Caldwell (Cr); Lakehurst (Ds).

NEOASCIA Will.

N. globosa Walk. Princeton VII, 21, Westville V, 19, Buena Vista VI, 11.

N. distincta Will. Ashland V, 13 (Hk); Malaga IV, 3 (CG).

RHINGIA Scopoli.

R. nasica Say. Dover VI, 18, Newark VI, 16, Westville VIII, 28, Cumberland Co. IX, 1 (Jn); Clementon V, 30 (Hk).

VOLUCELLA Geoff.

V. evecta Walk. Dunnfield VII, 12, Orange Mts. VI, 13, Clementon V, 30.
var. *sanguinea* Will. Clementon VI, 25 (Hk).

V. vesiculosa Fab. Dunnfield VII, 8, Riverton V, 29 (Jn); DaCosta VI, 4, Manumuskin VI, 23 (Dke).

V. fasciata Macq. Bred from Cactus ("Opuntia"), obtained at Clementon; flies continued to emerge from V, 31 to VI, 16 (Kp); Anglesea VII, 10, Lahaway VII, 17 (Sm); Avalon VI, 8 (Jn); this insect is found wherever the prickly pear occurs, and there is no outward indication of its presence, save that it is always associated with the larva of the Phycitid, "Melitara prodenialis."

SERICOMYIA Meig.

S. chrysotoxoides Macq. Ft. Lee (Edwards); Newark VI, 16, Clementon V, 9 (Jn); Blackwood X, 10 (Vk); Manumuskin IX, 15 (Dke).

ERISTALIS Latr.

E. tenax Linn. This is the common "drone" or "chrysanthemum fly," which occurs throughout the State until late fall, and is said to pollinize chrysanthemums. It resembles a honey bee so closely that most persons decline to handle it, therefore it is also called "drone-fly." Its larva lives in the foulest excrement, and is a typical rat-tailed maggot.

E. æneus Fab. Boonton IX, 7 (GG); Orange, New Brunswick (Sm); Jamesburg, Clementon V, 10, Cape May VI, 14 (Jn); Ashland VII, 16, 5-mile beach VII, 20 (Hk).

E. dimidiatus Wied. Caldwell (Cr); Orange Mts., Westville VII, 5, Clementon V, 10 (Jn); Lucaston IX, 9 (Hk).

E. saxorum Wied. Caldwell (Cr); Trenton VII, 3 (Hk); Jamesburg VII, 4, Clementon V, 10 (div); Westville VII, 26, Anglesea VII, 19 (Jn).

E. meigenii Wied. Snake Hill IV, 26 (Lv); Westville VII, 5 (Jn); Trenton VII, 11 (Hk).

- E. bastardi** Macq. Snake Hill IV, 26 (Lv); Newark (Sm); Trenton VII, 7, Ashland VIII, 16 (Hk); Shark River VII, 12, Westville VII, 9, Anglesea VII, 19 (Jn).
- E. flavipes** Walk. Boonton VII, 30 (GG); Ft. Lee (Osburn); Sandy Hook VII, 6 (Bt); Westville IX, 13, Clementon V, 16, Anglesea VII, 19.
var. *melanostomus* Loew. Trenton IX, 3 (Hk).
- E. transversus** Wied. Orange Mts. VII, 4, Westville VII, 5, IX, 10 (Jn); Clementon V, VI, IX, X (div).

TROPIDIA Meig.

- T. quadrata** Say. Caldwell (Cr); Westville VII, 2, VIII, 23, Clementon V, 10 (Jn); Trenton VII, 11, 5-mile beach VI, 11 (Hk).
- T. calcarata** Will. Westville V, 19, Woodbury VI, 7.
- T. albistylum** Macq. Gloucester Co. VII, 15 (Sm); Clementon (Hk).

HELOPHILUS Meig.

- H. latifrons** Loew. Caldwell (Cr); Westville IX, 13 (Jn); Burlington Co. (Sm); Clementon V, 11, 16 (CG).
- H. similis** Macq. Ft. Lee (Osburn); Newark V (Sm); Sandy Hook, Jamesburg V, 19, Westville IX, 9 (Jn); Clementon X, 1 (Hk).
- H. lætus** Loew. Ft. Lee (Osburn); Merchantville V, 19, 31 (CG); Westville V, 19, VIII, 16 (Jn).
- H. chrysostomus** Wied. Caldwell (Cr); Ft. Lee (Osburn); Jamesburg VII, 4 (Hk); Riverton V, 19, Westville VII, 2 (Jn); Prospertown VI, 7 (Sm).
- H. distinctus** Will. Jamesburg VII, 4, Westville V, 19.
- H. conostomus** Will. Ft. Lee (Osburn); Cramer Hill V, 30 (CG); Westville VII, 2.
- H. divisus** Loew. Westville V, 14.
- H. integer** Loew. Newark VI, 16, Westville VI, 15, VII, 21 (Jn); New Brunswick VI, 5 (Sm).
- H. hamatus** Loew. Newark V (Sm); Elizabeth V, 15 (Kp).
- H. flavifacies** Bigot. Dunnfield, Del. Water Gap VII, 11.

MALLOTA Meigen.

- M. posticata** Fab. Morris Plains VI, 25, Clementon V, 16 (Jn); Caldwell (Cr); New Brunswick VII, 1 (Sm).
- M. cimbiciformis** Fall. Hewitt, Lakehurst (Ds); Trenton VII, 3 (Hk); Riverton VII, 3, Clementon V, 9.

TRIODONTA Macq.

- T. curvipes** Wied. Elizabeth V, 17, 21 (Kp); Anglesea IX, 20, Cape May VI, 14 (Jn).



Fig. 318.—*Mollota posticata* and its larva: enlarged.

TEUCHOCNEMIS O. S.

- T. bacuntius** Walk. Palisades (Lv); Ft. Lee (Osburn); Clementon V, 7 (CG).
T. lituratus Loew. Great Notch V (Dke); Malaga V, 1 (Hk).

PTERALLASTES Loew.

- P. thoracicus** Loew. Ft. Lee VIII, 30 (Dke); Gloucester Co. (Sm).

SYRITTA St. Farg. & Serv.

- S. pipiens** Linn. Common throughout the State, V to IX.

XYLOTA Meigen.

- X. pigra** Fab. Ft. Lee (Osburn); Iona IX, 12 (CG); Shark River VII, 1, Clementon V, 10, Anglesea VI, 19.
X. tuberans Will. Brown's Mills VI, 5 (Dke).
X. bicolor Loew. Hewitt (Ds); Englewood (OS); Clementon V, 30 (CG).
X. ejuncida Say. Morris Plains VI, 23, Orange Mts. VII, 4, Clementon V, 16 (Jn); Palisades VI, 28 (Lv); Riverton V, 19, 5-mile beach VI, 11, VIII, 5 (Hk).
X. angustiventris Loew. Morris Plains VI, 25, Dunnfield VII, 15 (Jn); Trenton VII, 5, Anglesea VI, 11 (Hk).
X. metallifera Bigot. Clementon IV, 25 (Dke).
X. anthreas Walk. Jamesburg VII, 4, Merchantville VI, 28.
X. analis Will. Palisades VI, 7 (Lv); Clementon VI, 3 (Jn); Anglesea V, 28 (Dke).
X. chalybea Wied. Hewitt (Ds); Ft. Lee (Osburn); Caldwell (Cr); Clementon V, 14 (CG); DaCosta VI, 3 (Dke).
X. fraudulosa Loew. Ft. Lee (Osburn); Clementon IX, 5, Anglesea VI, 11.

CHRYSOCHLAMYS Rond.

- C. dives** O. S. Westville VI, 15.

BRACHYPALPUS Macq.

- B. frontosus** Loew. Newark V (Sm); Sandy Hook, Riverton V, 1 (Jn); Atco IV, 2 (Kp); Clementon V, 5 (Hk); Manumuskin V, 5 (Dke).
B. rileyi Will. Riverton IV, 14 (CG); Westville IV, 9, Clementon IV, 15.
B. sorosis Will. Clementon V, 14, 16; Manumuskin IV, 28 (Dke).

CRIORHINA Hoffm.

- C. umbratilis** Will. So. Amboy V, 10 (Jn); Merchantville V (Kp); Glassboro V, 19 (CG); Clementon V, 9-30 (div); Manumuskin V, 10 (Dke).
C. analis Macq. Hewitt (Ds); Newark VI, 16 (Jn); Clementon V, 16, 30 (div); Malaga VI, 1 (GG).

- C. intersistens* Walk. "New Jersey" (Walk); Clementon V, 30 (Hk).
C. verbosa Harris. Bergen Co. IV, 28 (Kp); Glassboro III, 28 (CG).
C. decora Macq. Hewitt (Ds); Caldwell (Cr); Newark VI, 14, Clementon V, 16 (Jn); Trenton VII, 3 (Hk); Manumuskin V, 10 (Dke).

MILESIA Latr.

- M. virginicensis* Drury. (*ornata* Fab.) Dunnfield VII, 11, 15, Clementon VIII, 9, Cumberland Co. IX, 1 (Jn); New Brunswick VIII, 7 (Sm); Clementon IX, 5, Malaga (Hk).

SPILOMYIA Meig.

- S. longicornis* Loew. Ft. Lee (Osburn); Riverton IX, 5, Westville IX, 13 (Jn); Clementon IX, 5 (Hk); Anglesea IX, 3 (Sm).
S. fusca Loew. Dunnfield VII, 14 (Jn); Hewitt (Ds); Palisades VIII, 14 (Dke).
S. hamifera Loew. Caldwell (Cr); Ft. Lee (Osburn); New Brunswick VI, 5 (Sm); Trenton VII, 3 (Hk); Clementon V, 30 (CG).

SPHECOMYIA Latr.

- S. vittata* Wied. Caldwell (Cr); Riverton V, 1, Clementon V, 9, 16 (Jn); Malaga V, 1 (CG).

TEMNOSTOMA St. Farg.

- T. bombylans* Fab. Ft. Lee (Osburn); Long Branch VI, 9 (Jn); Riverton IV, 4, Clementon VI, 2 (CG); Trenton VII, 3 (Hk); Merchantville V, 26 (Dke).
T. alternans Loew. Hewitt (Ds); Orange Mts. (Wdt).
T. trifasciata Robt. Anglesea VI, 11 (Hk).
T. pictula Will. Trenton VII, 3 (Hk).

CERIA Fab.

- C. abbreviata* Loew. Trenton VII, 3 (Hk); Merchantville V, 26 (Dke); Clementon V, 16, 30 (div).

Family CONOPIDÆ.

Medium-sized flies, with a large head, comparatively small, chunky body and a long abdomen, which is often constricted at base and enlarged bulb-like at tip, as in certain wasps. They are called "thick-head" flies, and have rather slender antennæ, though long for this series. The larvæ are parasites upon bees and grasshoppers.

CONOPS Linn.

- C. brachyrhynchus* Macq. Del. Water Gap VII, 11, Merchantville VI, 29, Atco VII, 12 (Jn); Clementon VIII, 15 (Hk).

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- C. bulbirostris** Loew. Delair VIII, 5 (Dke); Westville V, 31 (CG); Atco VII, 12 (Jn).
C. sylvosus Will. Caldwell (Cr); Clementon VI, 15 (Hk); Atco VII, 12 (Jn).
C. xanthopareus Will. Jamesburg VII, 4, Westville VIII, 16, Clementon V, 30 (Jn); Ocean Co. (Sm).
C. excisus Wied. Riverton VII, 3, DaCosta VII, 30.

PHYSOCEPHALA Schiner.

- P. tibialis** Say. Dunnfield VII, 8, Riverton VI, 20, VII, 30, Westville VII, 5 (Jn); Orange Mts. (Sm); Clementon VII, 15, Pemberton IX, 1 (Hk).
P. sagittaria Say. Ft. Lee (Bt); Orange Mts., Riverton IX, 11, Clementon VIII, 6, Anglesea VII, 15 (Jn).
P. furcillata Will. Dunnfield, Del. Water Gap VII, 14.
P. marginata Say. Manahawkin IX, 5 (Hk).



Conops tibialis.
Fig. 319.

ZODION Latr.

- Z. fulvifrons** Say. Morris Plains VI, 25, Westville IX, 10, Clementon V, 10 (Jn); Prospertown VI, 7 (Sm).
Z. nanellum Loew. Buena Vista VI, 11, Atco VII, 12 (Jn); Hammonton VIII, 26 (Dke).
Z. obliquefasciatum Macq. Riverton VII, 29, VIII 11.
Z. pygmæum Will. Avon IX, 27 (Hk); Iona IX, 12, Clementon VII, 29, Pemberton VII, 11 (CG).

STYLOGASTER Macq.

- S. neglecta** Will. Dunnfield VII, 11, Riverton VII, 30 (Jn); Wenonah VII, 22 (Dke); Clementon VII, 29 (Hk).
S. biannulata Say. New Jersey (Bt).

DALMANNIA Desv.

- D. nigriceps** Loew. Clementon V, 15-VI, 6 (div); Buena Vista VI, 11 (Jn).

ONCOMYIA Loew.

- O. abbreviata** Loew. Delair VIII, 5 (Dke); Woodbury VI, 7, Merchantville VI, 28, Atco VI, 4 (Jn); Clementon VI, 25.

MYOPA Fab.

- M. vesiculosa** Say. Newark V (Sm); Jamesburg VII, 4, Buena Vista VI, 11 (Jn); Camden V, 18, Lenola IV, 29 (Kp); Riverton IV, 23 (CG).
M. vicaria Walk. Riverton IV, 17 (Vk).

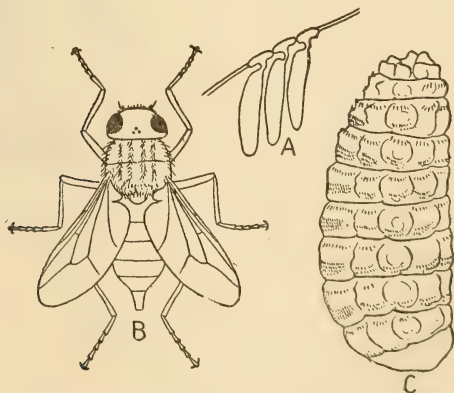
Family CESTRIDÆ.

These are the "bot-flies," usually of good size, sometimes very large, and peculiar by having the mouth parts almost entirely aborted. Some are hairy, yellow, with rather a pointed abdomen; others are very plump, blue black, with a white bloom, and very formidable in appearance. The larvæ live in the nasal passages, in the stomach or beneath the skin of the animals infested by them, and often cause serious functional disturbance. They also lessen the value of the skins. The ordinary bots attacking horses and cattle lay their eggs on the hair of the animals, where they are likely to be licked off, and so brought into the mucus-lined passages; hence it is a good plan, where bots are numerous, to keep horses cleaned and brushed and to prevent their licking themselves. Bots beneath the skin should be treated with mercurial ointment, and after a day or two squeezed out through a sufficient incision. Where they infest the stomach, or get into the nasal passages, a veterinarian must be consulted.

GASTROPHILUS Leach.

G. equi Fab. The horse bot-fly, which spends the larval stage in the intestines, and is passed naturally when full grown; it pupates under ground and the eggs are laid on the hair.

G. nasalis Linn. Caldwell (Cr).

HYPODERMA Clark.

The ox bot, *Hypoderma lineata*: a, eggs attached to hair;
b, fly; c, larva.

Fig. 320.

H. lineata Villers. The "Ox Warble": occurs rarely throughout the State.

H. bovis De Geer. Atlantic City, Belvidere (U S Ag).

These species live under the skin and form tumors and ulcers.

CESTRUS Linn.**O. ovis** Linn. The sheep-bot.

This species lives in the nasal and other head passages of sheep and causes a disease known as staggers, often resulting in death.

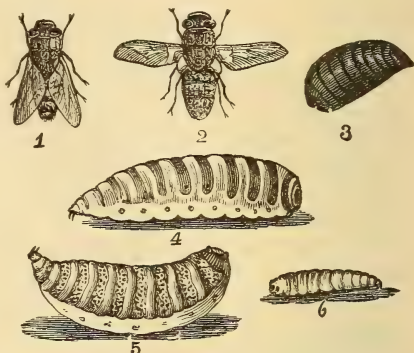


Fig. 321.—The sheep-bot, *Cestrus ovis*: 1, 2, flies, wings closed and open; 3, pupa; 4, 5, full grown larvæ; 6, young larva.

CUTEREBRA Clark.**C. buccata** Fab. Ocean Co. VI (Sm); Dunnfield VII, 12. A species living under the skin of rabbits.**C. horripilus** Clark. Riverton VII, 6.

Family TACHINIDÆ.

The Tachina flies are almost all parasitic and of the very highest usefulness, since they form the chief control of many caterpillars. They resemble house-flies, flesh-flies, and blue-bottles in appearance, but are much more bristly; sometimes formidable-looking from the array of sharp points projecting in every direction. The bristle on the third antennal joint is always bare, and this is the best character for the recognition of the family.

These flies often lay their eggs on the outside of the caterpillar, usually just back of the head, where the larvæ cannot easily get at them. They are white in color and quite large enough to be easily seen.

Cut-worms are a common prey of these flies; sometimes of hundreds of such larvæ gathered not two per cent. will be free of these white eggs. In an army worm year sometimes scarcely one per cent. of the last brood is free. Anywhere from one to 100 grubs may infest a single caterpillar, depending upon the size of the host.

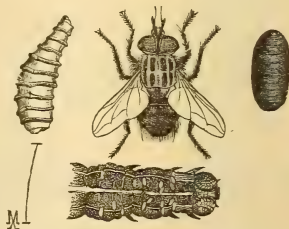


Fig. 422.—Tachinid parasite on cut-worms showing larva, pupa and adult, as well as the eggs on the anterior segments of a caterpillar.

GYMNOCLYTIA B. & B. (**CISTOGASTER**.)**G. immaculata** Macq. Westville VI, 26 (Jn); Glassboro VII, 8 (CG); Clementon V, 30, IX, 5 (Hk).**G. occidua** Walk. Dover VI, 17, Chester VII, 25, Westville, Atco VII, 12 (Jn); Middlesex Co. VII, 7, Jamesburg VII, 4 (Sm).**GYMNOSOMA** Meig.**G. fuliginosa** Desv. Caldwell (Cr); Woodbury VI, 7, Clementon VIII, 8, Buena Vista VI, 11, Anglesea VII, 19 (Jn).

PHORANTHA Rond.

- P. occidentis** Walk. Trenton V, 5 (Hk); Westville V, 19, Woodbury VI, 7, Atco VII, 9, Buena Vista VI, 11, Clementon V, 10.
P. nigrens V. d. W. Riverton X, 12, 20.

ALOPHORA Desv.

- A. æneoventris** Will. Clementon V, 16.
A. fumosa Coq. Dunnfield VII, 12, Clementon V, 16.
A. subopaca Coq. Type at Woodbury VI, 7, Riverton IX, 11.
A. pulverea Coq. Riverton X, 20.
A. diversa Coq. Riverton X, 12.

POLISTOMYIA Towns.

- P. trifasciata** Loew. (**plumipes** Fab.) Caldwell (Cr); Glassboro VII, 10, VIII, 2 (CG); DaCosta VII, 17 (Lt); Clementon IX, 7 (Hk).

TRICHOPODA Latr.

- T. pennipes** Fab. Cramer Hill VIII, 24, Merchantville VI, 28, Shark River VII, 12, Anglesea VII, 19, DaCosta VII, 30; a parasite of the squash bug, "*Anasa tristis*" (Jn); Clementon IX, 5 (Hk).

GALACTOMYIA Towns.

- G. radiata** Loew. Del. Water Cap VII, 10, Orange Mts. VII, 4, Westville VI, 15.

MYIOPHASIA B. and B.

- M. ænea** Wied. New Brunswick (Coll); Riverton IX, 20 (CG); Atlantic City VII, 15, Cape May VI, 22 (Jn); Lucaston IX, 9 (Hk); a parasite of "*Balaninus nasiceus*," "*Conotrachelus juglandis*" and "*Sphenophorus parvulus*," all of which are injurious weevils.
M. setigera Town. Avalon VII, 22, Cape May IX, 25.

CRYPTOMEIGENIA Br. and Berg.

- C. theutis** Walk. Caldwell (Cr); New Brunswick V (Sm); Riverton III, 20 (Jn); 5-mile beach VI, 11 (Hk); a parasite of "*Lachnosterna inversa*."

PHASIOCLISTA Town.

- P. metallica** Town. Boonton VIII, 8 (GG); Anglesea IX, 1 (Jn).

CERATOMYIELLA Town.

- C. conica** Town. Westville VII, 2.

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EULASIONA Town.

E. comstockii Town. Clementon VI, 6 (Hk).

ADMONTIA Br. and Berg.

A. demylus Walk. Atlantic Co. VIII; parasite of the pine saw-fly, "*Lophyrus abbotii*."

A. degeerioides Coq. New Brunswick (Sm); Trenton V, 21 (Hk).

A. pergandei Coq. "New Jersey" (A E S); Pemberton VII, 8 (Hk).

A. polita Coq. Lucaston VI, 27 (Dke).

A. hylotomæ Coq. Chester IX, 16 (Coll); Newark X (Jn); Trenton VIII, 8 (Hk).

A. nasoni Coq. Clementon IX, 11 (CG).

CLAUSICELLA Rondani.

C. johnsoni Coq. Riverton IX, 14.

ACTIA Desv.

A. pilipennis Fallen. Dunnfield VII, 15 (Jn); Trenton V, 21 (Hk).

CELATORIA Coquillett.

C. spinosa Coq. Dunnfield, Del. Water Gap VII, 12.

HYPOSTENA Meig.

H. dunningii Coq. New Brunswick VI, 18 (Sm); Woodbury V, 14, VI, 7.

H. tortricis Coq. Avalon VII, 22.

H. variabilis Coq. Dunnfield VII, 8, 15 (Jn); Trenton VII, 3, Clementon V, 30 (Hk); a parasite of "*Pyrausta penitalis*."

H. gilvipes Coq. Shiloh IX, 1.

H. floridensis Town. Trenton VII, 3 (Hk); Riverton IX, 11 (Jn).

H. flaveola Coq. Asbury Park VIII, 16.

MACQUARTIA Desv.

M. pristis Walk. Dunnfield VII, 8, 15 (Jn); New Brunswick VII, 18 (Sm); Trenton VII, 8 (Hk).

POLIDEA Macq.

P. areos Walk. Chester IX, 1 (Coll).

HYPOCHÆTA Br. and Berg.

H. longicornis Schiner. Dunnfield, Del. Water Gap VII, 15.

METHYPOSTENA Towns.

M. barbata Coq. Trenton VII, 17 (Hk).

LESKIA Desv.

L. thecata Coq. Riverton VII, 3 (Jn); Clementon VI, 25 (Hk).

L. analis Say. Riverton IX, 22 (Hk); Collingswood (CG); Westville VIII, 14, Clementon VIII, 6, Anglesea V, 28 (Jn).

LESKIOMIMA Br. and Berg.

L. tenera Wied. Dunnfield VII, 9, Riverton VII, 31, Woodbury V, 15 (Jn); Clementon IX, 5 (Hk).

EUPHYTO Town.

E. subopaca Coq. Type taken at Clementon V, 30 (Jn), VIII, 30 (Hk).

LEUCOSTOMA Meig.

L. senilis Town. Westville VIII, 13, Woodbury VI, 7.

SCIASMA Coq.

S. nebulosa Coq. Jamesburg VII, 4, Riverton V, 14.

HYALOMYODES Town.

H. triangulifera Loew. Culver's Lake V, 29 (Coll); Riverton IX, 14, Clementon VI, 25 (Hk); Pemberton V, 10 (CG).

ÆSTROPHASIA Br. and Berg.

Æ. ochracea Bigot. Orange Mts. (Jn); Lahaway VII, 5 (Sm).

Æ. clausa B & B. Clementon VI, 7 (Li).

Æ. signifera V. d. Wulp. Clementon VI, 7 (Li); Atco VI, 3 (Jn).

XANTHOMELANODES Town.

X. arcuata Say. Clementon VIII, 30, IX, 8, Iona IX, 12 (CG).

X. atripennis Say. Hammonton VII, 6 (Dke); Lakehurst VII, 18 (Coll); Clementon IX, 5 (Hk); Lucaston IX, 8, Iona IX, 12 (CG).

HEMYDA Desv.

H. aurata Desv. Trenton VII, 5 (Hk); Woodbury VI, 7, Clementon VII, 29 (CG).

EPIGRYMYIA Town.

E. polita Town. Woodbury VI, 7 (Jn); Clementon V, 30, VI, 25 (Hk).

E. floridensis Town. Westville VII, 4 (Jn); Riverton IX, 22, Clementon VII, 4 (Hk).

SIPHONA Meig.

- S. geniculata** DeGeer. Del. Water Gap VII, 8, Shark River VII, 12, Lenola V, 30, Ocean Co. V, Avalon VI, 30.

PARAPLAGIA Br. and Berg.

- P. spinulosa** Bigot. Chester IX, 3 (Coll); Pemberton IX, 1 (Hk); Atlantic Co. VII, 24 (Sm); Atco VI, 6 (Jn).

CYRTOPHLCÆBA Rond.

- C. horrida** Coq. Westville IV, 19 (Jn); Clementon V, 3 (Hk).

PLAGIA Meig.

- P. americana** V. d. W. Trenton VIII, 11, Pemberton VII, 8 (Hk); River-
ton VII, 31 (Jn).

SIPHOPLAGIA Town.

- S. rigidirostris** V. d. W. Riverton IX, 22 (Hk); Westville VIII, 13.

DISTICHONA V. d. W.

- D. varia** V. d. W. Atco VII, 12.
D. auriceps Coq. Trenton IX, 1, Clementon X, 4 (Hk); Belleplain IX,
8 (Dke).

PACHYOPHTHALMUS Br. and Berg.

- P. signatus** Meig. Jamesburg VII, 4; a parasite of "Pelopoeus cemen-
tarius."
P. floridensis Town. Woodbury VI, 7, Clementon V, 16, Atco VI, 18,
Cape May VI, 6; also a parasite of "Pelopoeus cementarius."

SENOTAINIA Macq.

- S. rubriventris** Macq. Riverton IX, 5, Atco VII, 12, Atlantic City VII, 15,
Buena Vista VI, 11 (Jn); Clementon V, 30, Lucaston IX, 9, Ashland
VII, 16 (Hk).
S. trilineata V. d. W. Trenton VII, 3 (Hk); Farmingdale VII, 14, Atco
VI, 6, Avalon VII, 29 (Jn); Clementon V-VIII (div); a parasite of
"Sphecius speciosus."

SIPHOSTURMIA Coq.

- S. rostrata** Coq. Iona V, 26 (Dke).

TRIACHORA Towns.

- T. unifasciata** Desv. (Belvosia) Chester
(Dkn); Trenton VII, 3 (Dke); West-
ville VIII, 23, Clementon VI, X, a para-
site of the army worm "Leucania uni-
puncta."



Fig. 323.—*Triachora unifasciata*.

LATREILLIMYIA Towns.

- L. bifasciata** Fab. (Belvosia) Palisades VII, 13 (Lv); Westville VII, 26, Clementon VIII, IX, 5 (Jn); Lakewood (Lansing); bred from "Eacles imperialis" and also infests "Citheronia regalis" and "Dryocampa rubicunda."



Fig. 324.—*Latreillimyia bifasciata*.

APHRIA Desv.

- A. ocypterata** Town. Jamesburg VII, 4, Clementon V, 30 (Hk); Westville VII, 21, Atco VII, 12, DaCosta VII, 30, Buena Vista VI, 11 (Jn).

OCYPTERA Latr.

- O. carolinæ** Desv. Caldwell (Cr); Westville VI, 26, Atco VI, 18, Atlantic City VII, 15, Cape May VI, 14 (Jn); Pemberton VII, 8, Clementon VI, 24, X, 4 (Hk); parasite of the army worm, "Leucania unipuncta."
- O. argentea** Town. Orange Mts. VII, 4, Westville VII, 2.
- O. dosiades** Walk. Dover VI, 25, Westville VI, 26, Atco VII, 12, Atlantic City VII, 15, Anglesea VII, 19.

LINNÆMYIA Desv.

- L. comta** Fall. New Brunswick VIII, 11 (Coll); Trenton VII, 11, Pemberton IX, 1, Ashland V, 13 (Hk); Farmingdale VII, 14, Westville VI, 27, VII, 21 (Jn).

PANZERIA Desv.

- P. radicum** Fab. Riverton V, 3 (GG); Clementon V (div); a parasite of "Hyphantria cunea."
- P. penitalis** Coq. Riverton X, 9 (Jn); Clementon VIII, 30 (CG); a parasite of "Pyrausta penitalis."

MACROMEIGENIA Br. and Berg.

- M. chrysoprocta** Wied. Orange Mt. VIII, 29 (Coll); Trenton VII, 7 (Hk); Pemberton IX, 8 (CG); Lakewood (Lansing).

GYMNOCHÆTA Desv.

- G. alcedo** Loew. Newark VI, 16, Jamesburg VII, 4, Woodbury VI, 7, Riverton IV, 17, IX, 22 (CG); Clementon V, 30, VI, 25 (Hk).

EXORISTOIDES Coq.

- E. slossonæ** Coq. Westville V, 30, Clementon VI, 25, VII, 21.

EUSISYROPA Town.

- E. blanda** O. S. Dunnfield VII, 14, Farmingdale VII, 14 (Jn); New Hope VII, 10 (Hk); a parasite on "Euclea cippus," "Nisoniades brizo" and "Pyrameis cardui" (Coq).

- E. boarmiae* Coq. Atlantic Co. VII; bred from the oak tortrix, "*Cacœcia fervidana*" (Sm).

EXORISTA Meig.

- E. helvina* Coq. Dunnfield VII, 14, New Brunswick, Jamesburg, Anglesea VII, 11.
- E. confinis* Fall. Dunnfield VII, 12, Orange Mts. VII, 4, Farmingdale VII, 14, Riverton III, 3, Woodbury V, 14 (Jn); Trenton VIII, 11 (Hk); a parasite of "*Lycæna pseudargiolus*" and "*Thecla calanus*."
- E. futilis* O. S. Westville V, 19 (Jn); Ashland V, 13 (Hk); a parasite of "*Hadena apamiformis*" and "*Pyrameis atalanta*."
- E. griseomicans* V. d. W. New Brunswick VIII, 14 (Sm); Anglesea V, 11 (Hk); a parasite of "*Orgyia leucostigma*."
- E. eudryæ* Town. Clementon VII, 26; a parasite of "*Acronycta hama-melis*," "*Agrotis ypsilon*," "*Eudryas unio*," "*Hyperchiria io*" and "*Pyrameis atalanta*."
- E. spinipennis* Coq. Anglesea IX, 1.
- E. dorsalis* Coq. Riverton VIII, 25.
- E. pyste* Walk. Trenton V, 15 (Coll).

EUPHOROCERA Town.

- E. claripennis* Macq. Throughout the State III-VIII; a parasite of "*Anisota senatoria*," "*Clisiocampa disstria*," "*Empretia stimulea*," "*Orgyia leucostigma*," "*Vanessa antiopa*" and other Lepidoptera; also of "*Epilachna borealis*."
- E. cinerea* V. d. W. Clementon IV, 21 (Dke).

PHOROCERA Desv.

- P. rufilabris* V. d. W. Newark VI, Jamesburg VII, 4 (Jn); Trenton VIII, 11, Clementon VI, 24 (Hk).
- P. comstocki* Will. Dover VI, 18.
- P. doryphoræ* Riley. Parasite on potato beetle.
- P. leucaniæ* Coq. Riverton IV, 24 (Hk); Lucaston IV, 14 (Dke); a parasite of "*Leucania unipuncta*."

FRONTINA Meig.

- F. ancilla* Walk. Dunnfield, Del. Water Gap VII, 15.
- F. frenchii* Will. New Brunswick (Sm); Lucaston IX, 9, Pemberton IX, 1 (Hk); bred from "*Telea polyphemus*" IV, 10 (Sm); bred III, 17 from "*Attacus cecropia*" by G. Valentine, of Hammonton; also parasite on "*Anisota senatoria*," "*Clisiocampa americana*," "*Orgyia leucostigma*," "*Papilio turnus*," etc.



Fig. 325.—*Phorocera doryphoræ*.

F. rubentis Coq. Clementon VIII, 6.

F. aletiae Riley. Anglesea VI, 11 (Hk); a parasite of "*Halisidota tessellata*," "*Dasylophia anguina*" and "*Orgyia leucostigma*."

STURMIA Desv.

S. albifrons Walk. Burlington Co. VII (Sm); Riverton IX, 5, 22; a parasite of "*Ecpantheria scribonia*" and "*Leucarcia acraea*."

S. inquinata V. d. W. Newark; bred from "*Eacles imperialis*" (Sm); also a parasite of "*Protoparce celeus*," "*P. carolina*," "*Deilephila lineata*," etc.

S. normula V. d. W. Trenton IX, 7, Clementon V, 30 (Hk).

S. nigrita Town. New Brunswick V, 27 (Sm); Riverton V, 19 (Hk).

S. australis Coq. New Hope VII, 10 (Hk).

MASICERA Macq.

M. tenthredinidarum Town. Jamesburg VII, 4, Woodbury VI, 7.

M. celer Coq. Dunnfield VII, 8, 14, Westville VI, 27.

M. eufitchiae Town. New Brunswick (Sm); Clementon V, 5-30 (Hk); a parasite of "*Eufitchia ribearia*," and "*Hyphantria cunea*."

ACEMYIA Desv.

A. dentata Coq. Chester IX, 3 (Coll); Lucaston IX, 9 (Hk).

PSEUDOCHEETA Coq.

P. argentifrons Coq. Merchantville VI, 28.

PROSPHERYSA V. d. W.

P. æmulans V. d. W. Anglesea.

EUTHERA Loew.

E. tentatrix Loew. Clementon V, 30 (Hk).

TACHINOMYIA Town.

T. robusta Town. (*Tachina*) Clementon V, VI (Jn); Prospertown VI, 1 (Sm); a parasite of "*Agrotis ypsilon*."

TACHINA Meigen.

T. mella Walk. Newark V (Sm); Riverton IV, 16, Westville IV, 19, VII, 21 (Jn); Clementon X, 4 (Hk); Lakewood (Lansing); a parasite of "*Orgyia leucostigma*," "*Pyrrharetia isabella*," "*Leucaretia acraea*," etc.

BLEPHARIZEA Macq.

B. leucophrys Wied. Dunnfield VII, 15 (Jn); Trenton VII, 8 (Hk).

WINTHEMIA Desv.

W. quadripustulata Fab. Throughout the State V-X; parasitic on "Attacus cecropia," "Telea polyphemus," "Orgyia leucostigma," "Leucania unipuncta," "Halisidota tessellata," "Protoparce celeus," etc.



Fig. 326. — *Winthemia quadripustulata*.

PARADIDYMA B. and B.

P. singularis Town. Riverton VII, 3, IX, 25, Atco VII, 9 (Jn); Buena Vista VII, 10 (Li).

METACHÆTA Coq.

M. helymus Walk. Shark River VII, 12, Riverton IV, 17, Westville VII, 21, Clementon V, 16, Buena Vista VI, 11, Anglesea VII, 19.

PHORICHÆTA Rond.

P. sequax Will. Atco VI, 4.

CHÆTOPLAGIA Coq.

C. atripennis Coq. Type taken Westville VII, 2, '92; Riverton VI, 18.

METOPIA Meigen.

M. leucocephala Rossi. Trenton VII, 3, Clementon V, 30 (Hk); Riverton VIII, 13 (Jn).

ARABA Desv.

A. tergata Coq. Riverton VI, 16, Shiloh, Cumberland Co. IX, 1.

OPSIDIA Coq.

O. gonioides Coq. Type taken Atlantic City VII, 15, '94; Shark River VII, 12 (Jn); Anglesea VII, 20, VIII, 5 (Hk).

HILARELLA Rond.

H. decens Town. Jamesburg VII, 15 (Sm).

H. fulvicornis Coq. Del. Water Gap VII, 13, Atlantic City VIII, 28, Avalon VI, 29 (Jn); Pemberton VII, 8, Clementon V, 30, Anglesea VI, 11 (Hk).

H. polita Town. Westville V, 19, Woodbury VI, 7 (Jn); Clementon V, 21 (Hk); Atco VI, 21 (CG).

H. siphonina Zett. Clementon (Jn); Lucaston IX, 8 (CG).

BRACHYCOMA Rond.

- B. intermedia* Town. Westville VII, 21, Anglesea VII, 16.
B. sarcophagina Town. Shiloh IX, 1.
B. sheldoni Coq. Trenton V, 23 (Hk).

GONIA Meig.

- G. senilis* Will. Split Rock Lake V, 28 (GG); Trenton V, 21 (Hk); Buena Vista VI, 6 (Li); Clementon V, 12, Atco VII, 12.
G. capitata DeGeer. Caldwell (Cr); Westville IV, 9, Clementon IV, VI, Buena Vista VI, 11; a parasite of cut-worms, "*Hadena devastatrix*," "*Peridroma saucia*," etc.

SPALLANZANIA Desv.

- S. hesperidarum* Will. Westville VI, 27, VII, 2, Atco IX, 11, Anglesea VI, 25 (Jn); Clementon VI, 25 (Hk); a parasite of "*Eudamus tityrus*."

GÆDIOPSIS Br. and Berg.

- G. ocellaris* Coq. Newark VII (Sm); Trenton VII, 7 (Hk).

CHÆTOGÆDIA Br. and Berg.

- C. analis* V. d. Wulp. Trenton VII, 11 (Hk).

MICROPHTHALMA Macq.

- M. disjuncta* Wied. Boonton VIII, 28 (GG); Dunnfield VII, 15, Riverton IX, 11, Atco VII, 12, IX, 8; a parasite of "*Lachnosterna arcuata*."

TRICHOPHORA Macq.

- T. ruficauda* V. d. W. Caldwell (Cr); Trenton VIII, 11 (Hk); Westville VII, 24, VIII, 14 (Jn).

CUPHOCERA Macq.

- C. fucata* V. d. W. New Brunswick, Ocean Co. (Sm); Jamesburg VII, 4, Westville VI, 14, Atco IX, 11 (Jn); Clementon V, 30, VIII, 9 (Hk).

PELETERIA Desv.

- P. robusta* Wied. Boonton VII, 10 (GG); Glassboro VIII, IX, 6 (CG); Clementon VI, 25, X, 4 (Hk).

ARCHYTAS Jaen.

- A. hystrix* Fab. Caldwell (Cr); Shark River VII, 12, Westville VII, 10, Clementon VIII, 6 (Jn); Lucaston IX, 9 (Hk); Atco IX, 8 (CG); Chester (Dn).

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- A. aterrима** Desv. Throughout the State VI-X; a parasite of "*Acronycta occidentalis*," "*Lagoa crispata*," etc.
A. analis Fab. Clementon X, 4 (Hk).

ECHINOMYIA Dumeril.

- E. decisa** Walk. "New Jersey" (Coq).
E. florum Walk. Clementon V, 10, X, 4 (div); Atco VI, 4, Buena Vista VI, 11.
E. dakotensis Town. Lucaston VIII, 27 (CG); Atco IX, 11, Buena Vista VI, 11 (Jn); Clementon IX, 5, X, 4 (Hk); Anglesea (W).

EPALPUS Rond.

- E. signiferus** Walk. Split Rock Lake IV, 28 (GG); Caldwell (Cr); New Brunswick (Sm); Riverton IV, 17, Westville IV, 26 (Jn); Atco IV, 2 (Kp).

BOMBYLIOMYIA B. and B.

- B. abrupta** Wied. Dunnfield VII, 4, Morris Plains (Jn); Caldwell (Cr); Ft. Lee (Bt); Camden IX, 2 (Kp); Trenton (U S Ag).

Family DEXIIDÆ.

The "nimble flies" of Comstock differ from the Tachinids which they otherwise resemble, in the longer legs and in having the bristle of the antennæ plumose to the tip. They are much less abundant, but are also parasitic in habit.

MYOCERA Desv.

- M. simplex** Big. (*eremides* Wlk.) Chester IX, 16 (Coll); Westville VI, 21, Woodbury VII, 7, Atco VI, 18, Buena Vista VI, 11.

PARAPROSENA B. and B.

- P. apicalis** Desv. Del. Water Gap VII, 14, Dover VI, 7.

MELANOPHORA Meig.

- M. roralis** Linn. Del. Water Gap VII, 12, Clementon VIII, 6 (Jn); Avalon VI, VII (div).

DEXIA Meig. (*ZELIA* Desv.)

- D. vertebrata** Say. Delaware Water Gap VII, 8.

PHASIOPS Coq.

- P. flava** Coq. Caldwell (Cr).

PTILODEXIA B. and B.

P. tibialis Desv. Del. Water Gap VII, 14, Orange Mts. VII, 4, Riverton V, 29, Clementon V, 16 (Jn).

EUANTHA V. d. Wulp.

E. liturata Oliv. DaCosta VII, 30.

CHÆTONA V. d. Wulp.

C. macroptera V. d. Wulp. Trenton VII, 7 (Hk).

THELAIRODES V. d. Wulp.

T. basalis Giglio-Tos. Dover VI, 23, Orange Mts.

T. cinereicollis V. d. Wulp. Riverton V, 30.

THELAIRA Desv.

T. leucozona Panz. Avalon VII, 22.

THERESIA Desv.

T. tandrec Desv. Chester (Sm); Malaga VIII, 4 (CG).

Family **SARCOPHAGIDÆ.**

These are the "flesh flies," so called because they lay their eggs on exposed meats or other animal matter, these eggs being either ready to hatch or actually hatched when laid. The antennal bristle is here plumose at the base and bare at tip, and as scavengers the insects are useful, some larvæ occurring in excrement and decay of all sorts.

SARCOPHAGA Meig.

S. carnaria Linn. Anglesea VII, 19, Cape May VI, 14. This is the common flesh-fly.

S. ægra Walk. Westville V, 19, Anglesea VII, 19.

S. georgiana Wied. Common throughout the State.

S. sarracenizæ Riley. New Brunswick VIII, 7 (Coll).

S. incerta Walk. Lakehurst IX, 26 (Coll).



Fig. 327.—A flesh-fly, very much enlarged.

HELICOBIA Coq.

H. helcis Town. Chester IX, 3, New Brunswick VI, 4 (Coll); Avalon VII, 22.

Family MUSCIDÆ.

This family contains the common house-fly, the stable fly, the horn-fly, the blow-fly and similar well-known insects. All of these have the antennal bristle hairy or plumose to the tip, but have no spines on the abdomen except at the end, about the anal segments.

The larvæ of these flies are true maggots, and with few exceptions they live in decaying material of all kinds, excrement, putrid meat, garbage; etc. Eggs are laid in masses and hatch in a few hours, the larval life being often scarcely a week.

As scavengers these insects are useful, but they become a nuisance in the house and in the stable. While the majority of the flies gain their living by scraping and lapping liquid or pasty foods, a few of them are blood-suckers, the mouth being developed for piercing and sucking.

POLLENIA Desv.

P. rudis Fab. Common throughout the State V-VIII; this is a larger fly than the common house-fly, but is also found on windows, especially in late summer.

CHRY SOMYIA Desv.

C. macellaria Fab. Common throughout the State VI-VIII; the larva of this fly, known as the screw-worm, has done great harm in the southwest, but is not injurious in New Jersey.

CYNOMYIA Desv.

C. cadaverina Desv. Boonton X, 9 (GG); Westville IX, 9, Clementon V, 9 (Jn); Lakehurst IX, 26 (Coll).

CALLIPHORA Desv.

C. erythrocephala Meig. Common throughout the State IV-X.

C. vomitoria Linn. This is the common "blow-fly" which occurs everywhere in the State, all season.

C. viridescens Desv. Westville IV, 9.

LUCILIA Desv.

L. cæsar Linn. Common throughout the State IV to XI.

L. sylvarum Meig. Jamesburg, Westville V, 19, Atlantic City, Anglesea VII, 10.

L. sericata Meig. Atlantic Highlands VII, 11 (Lv); Riverton IX, 9, Clementon V, 9 (Jn).

PROTOPHORMIA Town.

P. terræ-novæ Desv. Dover VI, 17, Westville VI, 15 (Jn); Paterson V, 28 (Coll).

PHORMIA Desv.

P. regina Meig. Boonton IV, 12 (GG); Caldwell (Cr); New Brunswick (Sm); Jamesburg VII, 4, Westville V, 15, Avalon VIII, 22 (Jn).

PSEUDOPYRELLIA Girschner.

P. cornicina Fab. Riverton IX, 9, Westville.

PROTOCALLIPHORA Hough.

P. splendida Macq. Ashland VII, 16 (Hk).

MORELLIA Desv.

M. micans Macq. Newark VI, 16, Westville VII, 21, Shiloh IX, 1 (Jn); New Brunswick (Sm).

MUSCA Linn.

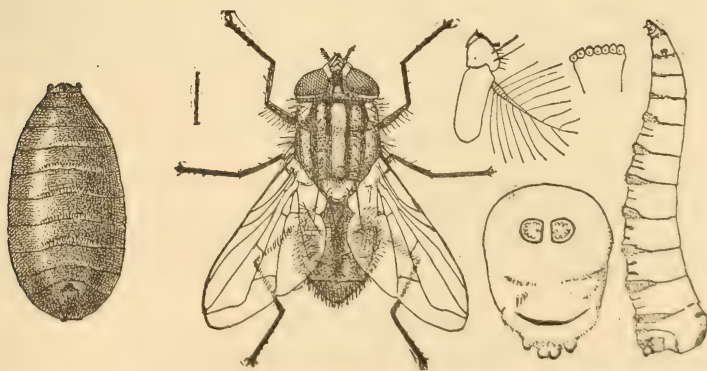


Fig. 328.—The "house fly," *Musca domestica*: larva with details at right; puparium at left; adult in center: all enlarged.

M. domestica Linn. House or "typhoid fly": common throughout the State, all year around in sheltered places. It breeds preferably in horse manure, but is not averse to other excrementitious matter.

GRAPHOMYIA Desv.

- G. maculata** Scop. Jamesburg VII, 4, Clementon V, 12, VIII, 8, X, 1 (Jn);
Riverton VII, 12 (CG).

STOMOXYS Geoff.

- S. calcitrans** Linn. The "stable-fly," common throughout the State; a great pest to cattle (Sm).

LYPEROSIA Rond. (HÆMATOBIA Desv.)



Fig. 329.—The horn fly, *Lyperosia irritans*: a, egg; b, fly; c, d, head and mouth parts: much enlarged.

- L. irritans** Linn. (*serrata* Desv.) "The horn-fly"; common throughout the State, but not so abundant as in previous years. Cattle may be protected from its attacks by sponging lightly with fish oil, to which a little crude carbolic acid has been added.

MUSCINA Desv.

- M. stabulans** Fall. New Brunswick VI, VII (Sm); Riverton IX, 20 (CG); Shark River VII, 9, Westville VII, 5.
M. assimilis Fall. New Brunswick, Monmouth County VII (Sm); Westville IV, 9 (Jn).

MYOSPILA Rond.

- M. meditabunda** Fab. Westville VII, 21, Clementon V, 10.

Family **ANTHOMYIDÆ**.

The flies of this family so closely resemble those of the preceding that, to the ordinary observer, they seem to be alike. Some of the species

come into houses at times and are not usually noticed as being different from the common species.

In the larval stages the habits differ. Many, perhaps the most, are scavengers, as are the muscids; a few are parasitic, as are the Tachinids; quite a number feed in living vegetation, either in roots, as the onion and cabbage maggot, or mine in leaves, as in beet.

The root maggots are difficult to deal with, and not all methods are equally useful in all localities. Tobacco, hellebore, kainit, lime with carbolic acid or turpentine have all been used as repellants or destroyers with more or less success.

Bisulphide of carbon injected into the soil has proved useful in some cases, and so has a tarred card surrounding a plant and resting on the surface. The farmer must usually learn by experience the particular method most useful in his locality.

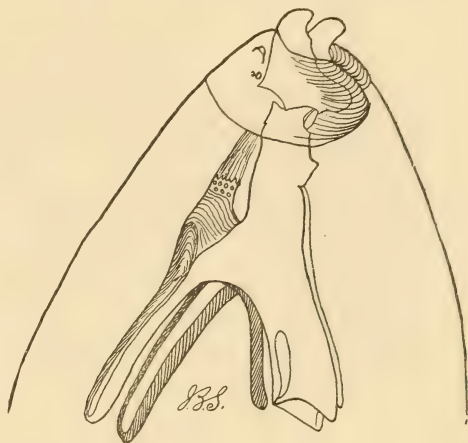


Fig. 330.—Head and scraping hooks of a root maggot, very much enlarged.

HYDROTÆA Desv.

- H. dentipes* Fab. Pemberton V, 10 (Hk).
- H. armipes* Fall. New Brunswick (Sm); Riverton V, 14, Avalon VII, 22 (Jn); Pemberton V, 10 (CG).
- H. impexa* Loew. Dunnfield, Del. Water Gap VII.
- H. metatarsata* Stein. Clementon V, 3 (Hk).

OPHYRA Desv.

- O. leucostoma* Wied. Boonton VII, 19 (GG); New Brunswick VI, 1 (Sm); Westville VII, 21 DaCosta VII, 19, Shiloh IX, 1.

HOMALOMYIA Bouché.

- H. canicularis* Linn. New Brunswick VII, Burlington Co. (Sm); Delair III, 1, bred from nest of "*Vespa germanica*" (Dke).
- H. scalaris* Fab. Del. Water Gap VII (Jn); New Brunswick (Sm).
- H. incisurata* Zell. Shark River VII, 12.
- H. fasciculata* Loew. Delaware Water Gap VII.

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- H. manicata* Meig. (*acra* Walk.) Caldwell (Cr); Lucaston IX, 2 (Dke).
H. fuscula Fall. Forest Hill VIII (Wdt).

HYETODESIA Rond.

- H. houghii* Stein. Del. Water Gap VII, 11, Woodbury VI, 7.
H. leucorum Fall. (*pylone* Walk.) Del. Water Gap VII, 8, Clementon V, 16 (Jn); Merchantville V, 26, VI, 4 (Dke).
H. errans Meig. Delaware Water Gap VII, 14.
H. serva Meig. Delaware Water Gap VII, 12, 14.
H. rufitibia Stein. Cape May IX, 21 (Dke).
H. pallidula Coq. Delaware Water Gap VII, 12.
H. pruinosa Macq. Woodbury VI, 7 (Jn); Manumuskin X, 8 (Dke).
H. umbratica Meig. Forest Hill VI (Wdt).
H. proxima V. d. Wulp. Newark V (Wdt).
H. varipes Coq. Iona IX, 12 (CG).

LASIOPS Meig.

- L. cunctans* Meig. Newark V (Wdt).

MYDÆA Desv.

- M. obscuripennis* Stein. Clementon IV, 25 (Hk).

SPILOGASTER Macq.

- S. pagana* Fab. Del. Water Gap VII, 14, Newark VI, 16, Merchantville VI, 21, Westville VII, 21.
S. fusca Stein. Atco VI, 6.
S. abiens Stein. Delaware Water Gap VII, 11.
S. lysinoë Walk. (*amœba* Stein.) Riverton V, 29.
S. humeralis Zett. Westville VI, 6 (Jn); Merchantville V, 26 (Dke).
S. urbana Meig. Del. Water Gap VII, 4 (Jn); Orange Mts. VII, 1 (Wdt).
S. demigrans Zett. Atco VI, 6.
S. obscurinervis Stein. New Brunswick VI, 1 (Sm); Brown's Mills V, 21 (Dke).
S. socialis Stein. Orange Mts. V (Wdt); Trenton VII, 4 (Hk).
S. crepuscularis Stein. Del. Water Gap VII, 8, Westville VIII, 14.
S. diruta Stein. Princeton VII, 21, Shiloh IX, 1.
S. uniseta Stein. Malaga IX, 15 (Hk).

LIMNOPHORA Desv.

- L. æquifrons* Stein. New Brunswick (Sm).

- L. narona* Walk. (*cyrtoneurina* Stein.) Toms River IX, 22 (Dke); Sea Isle City VII, 22 (Jn); Anglesea VII, 12 (Coll).
L. arcuata Stein. Riverton IX, 29, Manumuskin X, 8 (Dke).
L. discreta Stein. Lucaston IX, 28 (Dke).

ANTHOMYIA Meigen.

- A. pluvialis* Linn. Great Notch V, 5 (Dke); New Brunswick VIII, 5 (Coll); Trenton VIII, 11 (Hk).
A. albicincta Fall. Jamesburg, Farmingdale VII, 14, Atco IX, 9.
A. radicum Linn. This is the radish maggot, and often decidedly troublesome.
A. pratincola Panz. Jamesburg VII, 4 (Hk); Atco VII, 9 (Li); Iona V, 24 (Dke); Lahaway VIII, 1 (Sm).
A. latitarsis Zett. Del. Water Gap VIII, 15 (Jn); Manumuskin X, 20 (Dke).

HYDROPHORIA Desv.

- H. ambigua* Fall. Fort Lee VII, 4 (Dke).
H. divisa Meig. DaCosta VII, 30 (Dke).

HYLEMYIA Desv.

- H. lipsia* Walk. Del. Water Gap VII, 12, Dover VI, 18 (Jn); Ft. Lee VII, 4 (Dke); Woodbury V, 14, Clementon V, 30, Iona VI, 8, Avalon VII, 29 (Jn).

HAMMOMYIA Rond.

- H. unilineata* Zett. Trenton IV, 16 (Coll).

EUSTALOMYIA Kow.

- E. vittipes* Zett. Del. Water Gap VII, 8 (Jn); National Park V, 20 (Dke); Iona IX, 12 (CG).

EREMOMYIA Stein.

- E. cylindrica* Stein. Riverton X, 12 (Jn).

PHORBIA Desv. (CHORTOPHILA Rond.)

- P. fusciceps* Zett. (*cilicrura* Rond.) Palisades IV, 4, Highlands VII, 11 (Lv); Jamesburg VII, 4, Riverton IX, 25, Westville VII, 2 (Jn); Burlington Co. V, Cumberland Co. (Sm). A general feeder in roots of cabbage, raddish, onions, seed corn, etc., etc.
P. cinerella Fall. Newark V, New Brunswick (Sm).
P. lævis Stein. Riverton VII, 24.

P. brassicae Bouché. The common cabbage maggot; occurs throughout the State, some seasons very abundantly.

P. cepetorum Mead. The imported onion maggot, often injurious throughout the State.

P. ceparum Meig. (*antiqua* Schiner.) The common onion maggot; often a pest in South Jersey.

P. anane Walk. Newark VI, 16.

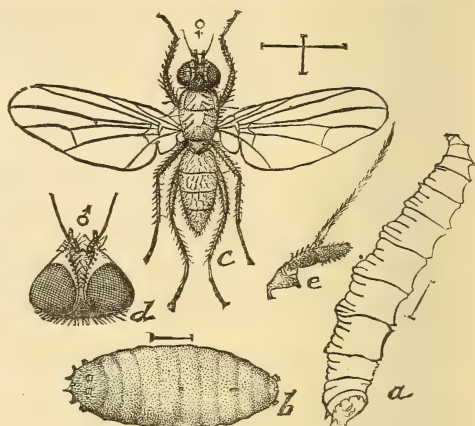


Fig. 331.—The cabbage maggot, *Phorbia brassicae*: a, larva; b, pupa; c, adult: all enlarged.

PEGOMYIA Macq.

P. vicina Lintner. Richfield

VI, 7 (Coll); Farmingdale VII, 14, Westville VII, 21; this is one of species mining the leaves of beets in the larval stage.

P. latitarsis Stein. Delaware Water Gap VII, 15.

P. unicolor Stein. Delaware Water Gap VII, 15.

CHIROSIA Rond.

C. capito Coq. Lucaston IX, 28, Hammonton IX, 6, Toms River IX, 22, Manumuskine X, 21 (Dke).

HOPLOGASTER Rond.

H. nigritarsis Stein. Woodbury V, 14, Clementon V, 30, VIII, 11, Avalon VII, 29.

TETRACHAETA Stein.

T. unica Stein. Avalon VIII, 8 (CG).

TETRAMERINX Berg.

T. unica Stein. Atlantic City VII, 21 (Dke); Ocean City V, 7 (Jn).

PHYLLOGASTER Stein.

P. cordyluroides Stein. Avalon VII, 19 (Hk).

CARICEA Desv.

C. antica Walk. Ocean County V (Sm); Westville VII, 5, Anglesea VII, 19, Sea Isle City VII, 22.

CÆNOSIA Meigen.

- C. tibialis* Stein. Anglesea IV, 26 (Sm).
C. nivea Loew. Del. Water Gap VII, 15, Atco VII, 12, Avalon VII, 29, Anglesea VII, 19 (Jn); Lucaston IX, 23 (Dke).
C. calopyga Loew. Merchantville VI, 28 (Jn); Delair X, 19 (Dke).
C. ausoba Walk. (*aurifrons* Stein.) Passaic VI, 8, Westville V, 24, Shiloh IX, 1 (Jn); Merchantville V, 26 (Dke).
C. lata Walk. (*canescens* Stein.) Riverton VI, VII (CG); Lucaston V, 28, IX, 12 (Dke); Clementon V, 10, Atlantic City VII, 15, Anglesea VII, 19 (Jn).
C. nudiseta Stein. Ft. Lee VII, 4, Iona VI, 8 (Dke); Anglesea V, 28 (Sm).
C. triseta Stein. Orange Mts. V (Wdt); Jamesburg VII, 4.
C. sexnotata Meig. Pemberton V, 10 (Hk).
C. fuscopunctata Macq. New Brunswick VII (Sm).
C. flavicoxa Stein. Clementon V, 10 (CG).
C. antennalis Stein. Lucaston VIII, 27 (Dke).
C. hypopygialis Stein. Culver's Lake V, 29 (Coll); Delair VIII, 18 (Dke).
C. verna Fab. Lucaston V, 28 (Dke).

DEXIAPSIS Pok. (LISPOCEPHALA Stein.)

- D. lacteipennis* Zett. Delaware Water Gap VII, 15.

SCHCENOMYZA Haliday.

- S. dorsalis* Loew. Ocean Co. V, Anglesea V, 28 (Sm); Manumuskin IX, 15 (Dke).
S. chrysostoma Loew. Shark River VII, 12, Riverton IV, 30.

LISPA Latr.

- L. uliginosa* Fall. Jamesburg VII, 4 (Jn); Pemberton VII, 8 (Hk); Da-Costa VII, 20 (Dke).
L. albitarsis Stein. Trenton VIII, 11, Clementon X, 18 (Hk).
L. hispida Walk. Iona VI, 8, Lucaston IX, 28 (Dke).
L. consanguinea Loew. Brown's Mills X, 6 (Dke); Trenton, Clementon X, 18 (Hk).
L. tentaculata DeGeer. Riverton XI, 28 (Jn); Trenton, Clementon X, 18 (Hk).
L. polita Coq. Clementon X, 18, Trenton (Hk).
L. sociabilis Loew. Trenton VIII, 5 (Hk).
L. palposa Walk. Trenton VIII, 21, Avalon VIII, 8 (Hk).

FUCELLIA Desv.

- F. fucorum* Fall. New Brunswick III, 27, Anglesea IV, 11 (Coll); Riverton V, 1, Hainesport III, 26 (Dke); Clementon IV, 15 (Jn).

Family SCATOPHAGIDÆ.

Resembles the Borboridæ and differentiated from it by characters obvious to the specialist only. The larval habits are various, a number occurring in stems of "Rumex," but they are not at any time economically important.

CORDYLURA Fall.

- C. confusa* Loew. Newark VI (Wdt); Seaside Park V, 16 (Vk).
C. adusta Loew. Ft. Lee VII, 4 (Dke).
C. carbonaria Walk. Ashland V, 13 (Hk).
C. latifrons Loew. Shark River VII, 12, Westville V, Riverton VI, 19.
C. setosa Loew. "New Jersey" (A E S).
C. pleuritica Loew. Newark VI, 6, Clementon V, 12.
C. præusta Loew. Westville VI, 12, Clementon V, 30.
C. gracilipes Loew. Del. Water Gap VII, 12, Woodbury V, 14, Clementon V, 9 (Jn); Boonton VI, 2 (GG); Ashland V, 13 (Hk).
C. gilvipes Loew. Manumuskin IV, 2, National Park V, 6 (Dke).

PARALLELOMMA Becker.

- P. varipes* Walk. (*bimaculata* Loew.) Westville VII, 2, Clementon V, 30, Buena Vista VI, 7.

PSELAPHEPHILA Becker.

- P. similis* Coq. Glassboro V, 19 (Hk).

HYDROMYZA Fallen.

- H. confluens* Loew. Boonton VIII (GG).

SCATOPHAGA Meig.

- S. stercoraria* Linn. Newark VI, 17, Avalon VI, 30, Anglesea V, 28 (Jn); Camden IV, 18 (Kp).
S. furcata Say. New Brunswick IV, 20, Jamesburg IV, 8, V, 14 (Sm); Camden IV, 18 (Kp).
S. pallida Wlk. Delaware Water Gap VII, 14.
S. cerea Coq. Orange Mts. V (Wdt).

Family HETERONEURIDÆ.

Small flies, with a large hemispherical head, the front broad and bristly to the base of the antennæ, which are short. Abdomen elongate, narrow, somewhat compressed, wings broad and long, legs long. The larvæ are slender, cylindrical, and live in decaying wood, under bark of trees, etc.

HETERONEURA Fallen.

- H. latifrons** Loew. Dunnfield VII, 8 (Jn); Jamesburg VII, 15 (Sm).
H. albimana Meig. Delaware Water Gap VII, 12.
H. pictipes Zett. Riverton V, 14, Westville VI, 6.
H. melanostoma Loew. New Brunswick V, 28 (Sm); bred from decaying wood, Atco (Dke).

CLUSIA Haliday.

- C. lateralis** Walk. (*spectabilis* Loew). Palisades, Jamesburg VII, 4 Anglesea V, 28 (Dke).
C. flava Meig. Ft. Lee IV (Lv); Jamesburg VII, 15 (Sm).

Family **HELOMYZIDÆ**.

The species of this family have the abdomen long, broad and more or less flattened, the male genitalia being somewhat prominent. The wings are comparatively large and the costa is bristly. The larvæ live in dung of bats, rabbits, truffles, decaying wood, etc., and are not in any way harmful.

HELOMYZA Fallen.

- H. longipennis** Loew. Dunnfield, Del. Water Gap VII, 11.
H. plumata Loew. Dunnfield VII, 11 (Jn); Boonton VI, 16 (GG).
H. quinquepunctata Say. Boonton VI, 16 (GG); Lucaston IX, 7 (Dke).

ALLOPHYLA Loew.

- A. lævis** Loew. Delaware Water Gap VII, 12.

ANOROSTOMA Loew.

- A. marginata** Loew. Clementon V, 30 (Hk); DaCosta VI, 3, Lucaston V 30, Brown's Mills VII, 4 (Dke).

TEPHROCHLAMYS Loew.

- T. rufiventris** Meig. Orange Mts. VII (Wdt).

LERIA Desv.

- L. pectinata** Loew. Merchantville VII, 15 (Dke); Sea Isle City VII, 22.
L. pubescens Loew. Forest Hill IV (Wdt); Clementon V.
L. tristis Loew. Newark VI.
L. defessa O. S. Forest Hill IV (Wdt).
L. helvola Loew. (*Scoliocentra*) Dunnfield VII, 14, Newark VI, 13 (Jn); Boonton VI, 16 (GG).

Family BORBORIDÆ.

Medium to small black, brown or yellowish flies, having a short, quick flight. They are almost invariably found about decomposing organic matter, and often hover in clouds about dung or sewage, where their larvæ live.

LIMOSINA Macq.

- L. limosa* Meig. Culver's Lake V, 29, New Brunswick VII, Ocean Co. V (Coll).

BORBORUS Meigen.

- B. equinus* Fall. Culver's Lake V, 29 (Coll); Newark VI, 16, Westville V, 19 (Jn); Riverton IV, 8 (Dke).
B. geniculatus Meig. Boonton III, 3 (CG); Merchantville XI, 16 (Dke).

SPHÆROCERA Latr.

- S. subsultans* Fab. Culver's Lake V, 30, Newark (Coll); Woodbury V, 14 (Jn).

Family SCIOMYZIDÆ.

Head rounded, short, as broad or broader than the thorax. face retreating, abdomen long and narrow. Legs and wings long, the latter exceeding the abdomen. The flies occur along the banks of streams in which the larvæ live, and the wings are often ornamented. None are harmful in any way.

SCIOMYZA Fallen.

- S. nana* Fallen. Trenton VIII, 21 (Hk); Riverton IX, 1, Camden VIII, 24 (Jn); Cape May IX, 21 (Dke).
S. obtusa Fallen. Trenton VIII, 21 (Hk); Westville V, 19.
S. pubera Loew. Trenton VIII, 21 (Hk); Riverton IX, 29.
S. apicata Loew. Trenton V, 24 (Hk).
S. humilis Loew. Trenton VIII, 19 (Hk).

DRYOMYZA Fallen.

- D. simplex* Loew. Dunnfield VII, 14, Dover VI, 18.

NEUROCTENA Rond.

- N. anilis* Fall. Dunnfield, Del. Water Gap VII, 12.

TETANOCERA Latr.

- T. arcuata* Loew. Chester VIII, 7 (Coll); Dover VI, 18, Merchantville VI, 28.

- T. flavescens** Loew. Del. Water Gap VII, 8, 15, Morris Plains VI, 25, Westville VII, 12 (Jn); Merchantville VI, 26 (Dke).
- T. combinata** Loew. Elizabeth VII, 24 (Kp); Westville V, 19, Lenola V, 30, Woodbury VI, 7 (Jn); Pemberton VII, 18 (Hk); Anglesea V, 28 (Dke).
- T. lineata** Say. Newark, salt meadow IX (Wdt), X, 30 (Sm).
- T. sparsa** Loew. Dunnfield, Del. Water Gap VII, 15.
- T. pallida** Loew. Dunnfield VII, 8, Atco VII, 9 (Jn); Chester VIII, 7 (Coll); Camden VI, 6 (Kp).
- T. umbrarum** Loew. (*pictipes* Loew.) Dunnfield VII, 15, Westville V, 19, Lenola V, 30 (Jn); Pemberton VII, 8 (Hk); Cape May IX, 21 (Dke).
- T. saratogensis** Fitch. Chester IX, 1, Paterson VI, 7 (Coll); Pemberton VII, 8 (Hk); Atco VII, 9, Mullica Hill V, 30, Anglesea VII, 25.
- T. clara** Loew. New Hope VII, 10 (Hk); Dunnfield VII, 8, Merchantville VI, 28, Atco VI, 17, Clementon VIII, 9.
- T. plebeja** Loew. Boonton VI, 19 (GG); Culver's Lake V, 29 (Sm); Dunnfield VII, 8, Westville VIII, 28, Woodbury VI, 7.
- T. plumosa** Loew. Jamesburg VIII, 10 (Sm); Trenton IX, 7, Ashland VI, 22 (Hk); Lenola V, 30, Atlantic City VIII (Jn).
- T. canadensis** Macq. Ashland VI, 22 (Hk).

SEPEDON Latr.

- S. armipes** Loew. Westville V, 19, Lenola V, 30 (Jn); Pemberton VII, 8 (Hk).
- S. pusillus** Loew. Westville V, 19, VII, 21 (Jn); Ashland VII, 16, Pemberton IX, 7 (Hk).
- S. fuscipennis** Loew. Trenton VII, 5 (Hk); Westville IV, 19, V, 19, VIII, 23 (Jn); DaCosta VII, 17 (Dke); Clementon V, 1 (CG).

Family SAPROMYZIDÆ.

Small species, the head as broad or broader than the thorax, antennæ short and porrect, legs never elongate. The ovipositor is not horny but ends tube-like. The larvæ are slender and live in decaying vegetation.

LONCHÆA Fallen.

- L. rufitarsis** Macq. Palisades VI (Lv); larvæ and pupæ at Riverton in decayed wood IV, 3, imagoes IV, 16, Atco VII, 7 (Jn); Lahaway VII, 5 (Sm).
- L. polita** Say. Clementon X, 10 (CG).

PALLOPTERA Fallen.

- P. superba** Loew. Forest Hill VII, Orange Mts. VIII (Wdt).

CAMPTOPROSOPELLA Hendel.

- C. vulgaris** Fitch. (*Pachycerina verticalis*) Chester IX, 2 (Coll); Trenton IX, 7, Clementon V, 30 (Hk); Jamesburg VII, 4, Merchantville VI, 28, Anglesea VII, 19.

LAUXANIA Latr.

- L. obscura** Loew. Culver's Lake V, 29 (Sm); Dover VI, 17, Jamesburg VII, 4, Mullica Hill, Clementon V, 30.
- L. gracilipes** Loew. Palisades VII, 26 (Lv); Del. Water Gap VII, 11, Lenola VIII, 7, Clementon VIII, 11 (Jn).
- L. cylindricornis** Fab. Trenton V, 21 (Hk); Ocean Co. V (Sm); Clementon V, 30.
- L. latipennis** Coq. Buena Vista VI, 7 (Li); Egg Harbor VII, 10 (Sm).
- L. opaca** Loew. Buena Vista VI, 8 (Li); Avalon VI, 9.
- L. muscaria** Loew. Merchantville VI, 28, Avalon VI, 8.

SAPROMYZA Fallen.

- S. decora** Loew. Pemberton VIII, 8 (Hk); South Camden VI, 6 (Li).
- S. compedita** Loew. Jamesburg VII, 4, Atco VI, 4 (Jn); Anglesea V, 28 (Sm).
- S. philadelphica** Macq. New Brunswick VII, 20, Jamesburg VII, 15 (Sm); Cramer Hill VI, 10 (CG); Anglesea V, 28 (W).
- S. fraterna** Loew. Chester VII, 5 (Coll); Merchantville VI, 28.
- S. umbrosa** Loew. Lahaway VI, 21 (Sm); Atco VI, 17, Merchantville VI, 28, Anglesea VII, 10.
- S. macula** Loew. New Brunswick VII, 1 (Sm); Atco VII, 7, Westville V, 19, Cape May VIII, 20.
- S. bispina** Loew. Trenton VI, 3, Jamesburg VII, Anglesea VII (Coll).
- S. quadrilineata** Loew. Trenton V, 20, Glassboro V, 19 (Hk); Jamesburg VII, 4, Merchantville VI, 28, Clementon V, 30.
- S. lupulina** Fab. Boonton VI, 6, (GG); Middlesex County VII, 7 (Sm); Trenton V, 21, Lucaston IX, 9, Ashland V, 13 (Hk); Jamesburg VII, 4, Clementon V, 30 (Jn).
- S. longipennis** Meig. Clementon V, 10.
- S. innuba** Giglio-Tos. Riverton VI, 20.
- S. houghii** Coq. Atco VII, 12, Egg Harbor VII, 10 (Coll).
- S. connexa** Say. Merchantville V, 26, National Park VI, 10 (Dke).
- S. magna** Coq. Anglesea V, 28 (Dke).
- S. rotundicornis** Loew. Malaga VI, 1 (Dke).

Family **ORTALIDÆ**.

Small or medium-sized flies, often with metallic colors, the wings banded with brown or black. Head of good size, front broad, legs stout and only moderately long. The larval stages are not well known.

PYRGOTA Wied.

- P. undata* Wied. Caldwell (Cr); Orange Mts., Woodbury V, 22 (CG); Atco VI, 19 (Nell); Clementon VI, 5 (Dke).
P. valida Harris. Caldwell V, 16 (Cr); Westville V, 18, VII, 12 (div).

AMPHICNEPHES Loew.

- A. pulla* Wied. (*pertusus* Lw.) Newark VI, 16, Jamesburg VII, 4, Atco VI, 4, Buena Vista VI, 11, DaCosta VII, 30 (Jn); Wenonah VI, 14 (Dke); Egg Harbor VII, 10 (Coll).

RIVELLIA Desv.

- R. conjuncta* Loew. Jamesburg VII, 4, Atco VII, 12 (Jn); Buena Vista VI, 14 (Li); Malaga VII, 20, Anglesea V, 28 (W).
R. viridulans Desv. Throughout the State V-VIII, common.
R. quadrifasciata Macq. New Brunswick VII, 30 (Sm); Jamesburg VII, 15, Westville VI, 26, Clementon V, 30, VIII, 8 (Jn); Anglesea V, 28 (W).
R. flavimana Loew. Westville V, 19 (Jn); Clementon V, 30 (Hk).
R. variabilis Loew. Avalon VII, 29 (Jn); Anglesea V, 28, VII, 19 (div).
R. pallida Loew. Boonton VII, 10 (GG); Newark VI, 13 (Jn); Ocean Co. V (Sm); Anglesea VI, 11 (Hk).
R. brevifasciata Johns. Atco VI, 18 (Jn); Lacy VII, 14 (Dke).
R. boscii Desv. Trenton V, 21 (Hk).

TRITOXIA Loew.

- T. flexa* Wied. Westville VIII, 23, Woodbury VI, 7, Atco VI, 18 (Jn); Malaga IX, 15 (CG); Lucaston IX, 9 (Hk).
T. incurva Loew. Caldwell (Cr).

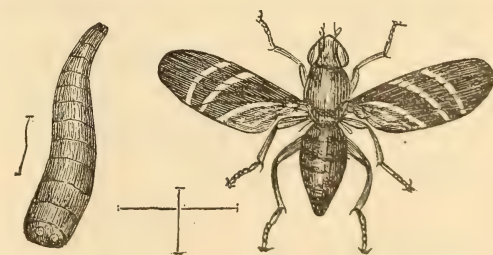


Fig. 332.—The onion fly, *Tritoxia flexa* and its larva: enlarged.

CAMPTONEURA Macq.

- C. picta* Fab. Throughout the State VI-X, common.

IDANA Loew.

- I. marginata* Say. "New Jersey" (A E S).

TEPHRONOTA Loew.

- T. narytia* Walk. (*humilis* Loew.) Jamesburg VII, 4, Atco VII, 9, Buena Vista VI, 11 (Jn); Belleplain IX, 8, Brown's Mills VII, 5 (Dke).

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TETANOPS Loew.

- T. luridipennis* Loew. Camden VII, 24 24 (DaCosta VII, 30, Clementon VII, 8, VIII, 9 (Jn); Glassboro VII, 5 (CG).

CALLOPISTROMYIA Hendel. (CALLOPISTRIA Loew.)

- C. annulipes* Macq. Boonton VII, 18 (GG); Merchantville VIII, 1 (Dke).

PSEUDOTEPHRITIS Johns. (STICTOCEPHALA Loew.)

- P. vau* Say. Boonton VIII, 12 (GG); Westville VII, 21 (Jn); National Park V, 20 (Dke); Prospertown IX, 25 (Sm).
P. corticalis Loew. New Brunswick V, 18 (Sm); Riverton IV, 22.

CHRYSOMYZA Fallen.

- C. demandata* Fab. Bloomfield IX (Wdt); New Brunswick X, 18 (Sm); Riverton IX, 9, X, 20 (Jn).

EUXESTA Loew.

- E. notata* Wied. Riverton V, 29, VIII, 21, Westville VI, 27 (Jn); Glassboro V, 19 (CG); Cumberland Co., bred from onions (Sm).
E. scoriacea Loew. Lacy V, 27 (Dke); Sea Isle City VII, 22, Two-Mile Beach VII, 22 (Jn).

CHÆTOPSIS Loew.

- C. ænea* Wied. New Brunswick (Sm); Trenton V, 21 (Hk); Pemberton V, 10 (CG); Lenola V, 30, Anglesea VII, 16, Cape May VI, 14.
C. apicalis Johns. Avalon VI, 9, Sea Isle VII, 22, Anglesea VII, 16.

SEOPTERA Loew.

- S. vibrans* Linn. Caldwell (Cr); New Brunswick VI, 4, Egg Harbor VII, 10 (Coll); Newbold VI, 30 (Dke).
S. colon Loew. New Jersey.

STENOMYIA Loew.

- S. tenuis* Loew. Atco VI, 4, 18, Buena Vista VI, 11, DaCosta VII, 30, Clementon VIII, 6.

EUMETOPIA Macq.

- E. rufipes* Macq. Trenton VII, 7, Pemberton VII, 8 (Hk); Camden VIII, 24, Westville VII, 4, 21.

SEPSISOMA Johns.

- S. flavescens* Johns. Trenton VII, 3 (Hk); Westville VIII, 19 (Jn); Wenonah VI, 14 (Dke).

Family TRYPETIDÆ.

The "peacock flies," so called because of their habit of elevating the wings and strutting about, peacock like. These wings are often prettily marked and spotted with black or brown. In the female the abdomen is often prolonged into a horny ovipositor. The flies are gracefully built, fly slowly and are noticeable by keeping their wings in constant motion. Most of the members of the series feed in plant tissue of some kind, either in leaves, in stems or in fruits, and a number of them are gall-makers. The only species of economic importance in this State is the "Apple maggot," which injures some of the early summer varieties. The only remedial measure is the prompt removal and disposal of all fruit from trees known to be infested.

STRAUSSIA Desv.

S. longipennis Wied. Boonton VII, 24 (GG); Caldwell (Cr); Ft. Lee (Bt), Orange Mts., Elizabeth V, 21, Camden V, 26 (Kp).

ACIDIA Desv.

A. fratria Loew. Trenton V, 31 (Hk); Riverton V, 20 (CG).

SPILOGRAPHIA Loew.

Z. flavonotata Macq. Glassboro VII 6 (CG).

TRYPETA Loew.

T. palposa Loew. Avalon VI, 8, on thistle (Jn); Anglesea V, 28 (W).

PLAGIOTOMA Loew.

P. obliqua Say. New Jersey (Bt); Clementon VIII, 6 (Jn).

CEDASPIS Loew.

O. atra Loew. Lucaston IX, 9, Ashland VI, 23 (Hk); Riverton VI, 18, Avalon VI, 8, Cape May VI, 14 (Jn); Belleplain IX, 16 (Dke); Anglesea V, VI (div).

O. polita Loew. Generally distributed; forms a gall on *Solidago* (Bt).

RHAGOLETIS Loew.

R. cingulata Loew. Atl. Highlands VII, 11 (Lv); Long Branch VII (OS).

R. tabellaria Fitch. Caldwell (Cr); Jamesburg VII, 4 (Jn); Buena Vista VII, 10 (Li).

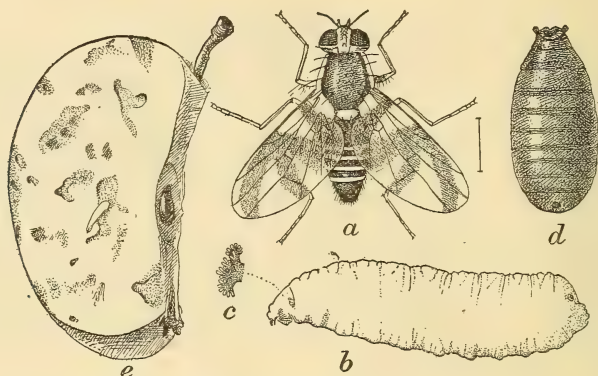


Fig. 333.—Apple maggot, *Rhagoletis pomonella*: *a*, adult; *b*, larva; *c*, spiracle of larva; *d*, puparium; *e*, apple, showing injury by larva: all enlarged.

- R. pomonella* Walsh. Montclair; the apple maggot, locally injurious but seems confined to a very few varieties (Sm); Weymouth VIII, 8, DaCosta VIII, 16, bred from huckleberries (Dke).

EUTRETA Loew.

- E. sparsa* Loew. Caldwell (Cr); Jamesburg VII (Dke); Trenton VI, 27, VIII, 26 (Hk).

EUROSTA Loew.

- E. comma* Wied. Chester (Dn); Trenton IX, 7, Clementon IX, 5 (Hk); Glassboro IX, 19 (CG).
E. solidaginis Fitch. Ft. Lee (Bt); Trenton V, 21 (Hk); Clementon V, 10.
E. conspurcata Doane. "New Jersey" (Doane).

NEASPILOTA O. S.

- N. alba* Loew. Lenola VIII, 7, Clementon VIII, 6; on ironweed.
N. albidipennis Loew. Ashland VII, 16 (Hk); Lenola VIII, 7, Westville VIII, 14, Clementon VIII, 6; on ironweed.
N. vernoniæ Loew. Westville VIII, 16, Clementon VIII, 6, Lenola VIII, 7; on ironweed.
N. achilleæ Johns. Avalon VI, 30; on yarrow "Achillea millefolium."

ICTERICA Loew.

- I. circinata* Loew. Trenton VIII, 21 (Hk); Westville VIII, 23, IX, 13.
I. seriata Loew. Forest Hill VIII (Wdt); Trenton VII, Clementon VIII, 23 (Hk).

TEPHRITIS Latr.

- T. geminata* Loew. Jamesburg VII, 4, Atco VII, 12 (Jn); Riverton VII, 3, Egg Harbor VII, 10 (Coll); Pemberton VII, 11 (CG).

- T. picturata* Snow. Avalon VII, 8 (Hk).
T. albiceps Loew. Caldwell (Cr); "New Jersey" (Bt).
T. clathrata Loew. Riverton VII, 19.
T. platyptera Loew. Merchantville V, 26 (Dke); Clementon V, 30 (Hk).
T. fucata Fab. Wildwood VIII, 12, Cape May VIII, 1 (Vk).

EUARESTA Loew.

- E. bella* Fitch. Caldwell (Cr); New Brunswick VII, 20 (Sm); Jamesburg VII, 4, Atco VII, 9, Clementon VI, 8 (Jn).
E. festiva Loew. Trenton IX, 7 (Hk); Westville VIII, 13, 28.
E. æqualis Loew. Trenton IX, 7 (Hk); Lucaston X, 15 (Dke); Westville VIII, 28 on "*Ambrosia artemisiæfolia*," Anglesea IX, 1.
E. subpura Johns. Wildwood VIII (Jn); Anglesea VIII (Sm).

URELLIA Desv.

- U. abstersa* Loew. Riverton VII, 18 (div); Avalon VII, 22 (Jn); Anglesea IX, 5 (Dke).
U. mevarna Walk. (*solaris* Loew.) Penbryn VIII, 2 (Dke); Egg Harbor VII, 10 (Coll); Cape May VI, 22.

Family MICROPEZIDÆ.

Flies slender or very slender, with large wings and long legs, antennæ variable, face retreating in profile. The larval habits are not definitely known.

CALOBATA Meigen.

- C. antennipes* Say. Dunnfield VII, 8, Princeton VII, 21, Jamesburg VII, 4 (Jn); Collingswood VII, 17 (CG).
C. lasciva Fab. Orange Mts. VII (Wdt); Atlantic City VII (Jn); Anglesea (W).
C. univitta Walk. Princeton VII, 21 (Jn); Cramer Hill V, 30 (CG).
C. alesia Walk. New Jersey V (A E S).

Family SEPSIDÆ.

"The flies belonging to this family are usually small, black and elongated, with the abdomen narrowed at the base, thickened and curved downward toward the extremity; with transparent, iridescent wing, usually hyaline, but often with a spot or spots toward the end, and are usually observed about decaying vegetables, excrement, cheese, ham, etc., often in swarms. The flies, for the greater part, run about actively, and are quick in flight. The best known are the species of '*Piophilæ*,' the larvæ of which are known as 'cheese-mites.' These larvæ live in

cheese, in ham or bacon, or, in general, in any fatty material, and often do much damage, being especially troublesome in pork-packing establishments. From the peculiar power of leaping possessed by the maggots they are often called 'skippers'; the act is performed by the larva seizing with its extended mouth hooklets the edge of the posterior truncature of the body and then suddenly releasing it while pulling hard."—Williston.

PROCHYLIZA Walk.

P. xanthostoma Walk. Riverton IV, 9, X, 9 (Jn); Cape May IX, 21 (Dke).

SEPSIS Fallen.

S. violacea Meig. New Brunswick VII, 20, Jamesburg VII, 15, Ocean Co. V (Sm); Trenton VII, 6 (Hk).

NEMOPODA Desv.

N. cylindrica Fab. Dover VI, 17, Morris Plains VI, 25, Riverton IX, 17, Trenton V, 20 (Hk).

N. minuta Wied. Chester IX, 2 (Coll); Newark VI, 14, Riverton VII, 3.



Piophilidae casei, parent of "skippers" in cheese, etc.

Fig. 334.

PIOPHILA Fallen.

P. casei Linn. This is the cheese mite or skipper, and occurs everywhere.

P. nigriceps Meig. Pemberton V, 10 (CG).

Family PSILIDÆ.

Slender flies of moderate size, with large wings, long legs and at least moderately long antennæ. The larvæ, so far as known, live in roots or galls.

LOXOCERA Meigen.

L. cylindrica Say. Del. Water Gap VII, 12, Camden VI, 10, Woodbury VI, 7, Clementon V, 30, Mullica Hill (Jn); Trenton VII, 11 (Hk).

L. pectoralis Loew. Dunnfield, Del. Water Gap VII, 11.

L. pleuritica Loew. Dunnfield, Del. Water Gap VII, 12.

CHYLIZA Fallen.

C. notata Loew. Caldwell (Cr).

C. apicalis Loew. Riverton VII, 2 (Jn); Merchantville VI, 4 (Dke).

PSILA Meigen.

P. bivittata Loew. Clementon, Lenola V, 30.

P. collaris Loew. Newark VI, 13, Atco VI, 4 (Jn); Clementon VI, 7 (Li); Brown's Mills VI, 9 (Dke).

P. lateralis Loew. Trenton V, 20 (Hk); Riverton VI, 20.

Family **DIOPSIDÆ**.

Our only species belonging to this family is easily recognized by the two lateral horns or processes from the side of the head upon which the eyes are situated. It occurs on skunk cabbage.

SPHYRACEPHALA Say.

S. brevicornis Say. Newark V (Wdt); Riverton IV, 14 (Jn); Clementon V, 5 (Hk); Wenonah V, 30 (Dke).

Family **EPHYDRIDÆ**.

"The flies of this family are never large, often small or even minute. The greater number of the species are inhabitants of wet places, about marshy ground, meadows, etc. They are always thinly pilose or bare species, and never with bright colors. The exceedingly large head and mouth of some species are very characteristic, but in others this character is not so apparent, and there is sometimes difficulty in separating the genera from those of the 'Drosophilidæ.' The larvæ of many forms are very peculiar, resembling the rat-tailed larvæ of the 'Syrphidæ' in many cases."—Williston.

In New Jersey the species are not notably abundant; but they occur in countless millions in the great salt lake in Utah, and in other alkaline lakes and ponds of the northwestern desert region.

DICHÆTA Meigen.

D. brevicauda Loew. Clementon V, 5 (CG); Ocean County V (Sm).

D. caudata Fall. Riverton IV, 8 (Dke); Manahawkin IX, 5 (Hk).

NOTIPHILA Fallen.

N. carinata Loew. Cape May VI, 22.

N. scalaris Loew. Shark River VII, 12 (Jn); Clementon V, 30 (Hk); Bridgeport V, 20 (Dke).

N. vittata Loew. Woodbury VI, 7.

N. bella Loew. Westville VI, 15.

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PARALIMNA Loew.

- P. appendiculata* Loew. Riverton IX, 11, Westville V, 19, Cumberland Co. IX, 1 (Jn); Ashland V, 13 (Hk).
P. decipiens Loew. Trenton VIII, 19 (Hk).

PSILOPA Fallen.

- P. atrimana* Loew. Riverton X, 9.
P. scoriacea Loew. Delaware Water Gap VII, 13 (Jn); Trenton VIII, 23 (Hk).
P. aciculata Loew. Avalon VIII, 8 (Hk).
P. fulvipennis Hine. Cape May VII, 1 (Vk).
P. flavida Coq. Avon IX, 27 (Hk).

GASTROPS Will.

- G. nebulosus* Coq. Trenton VIII, 21 (Hk); Clementon V, 5 (CG).

ILYTHEA Haliday.

- I. spilota* Curtis. Riverton IX, 17.

DISCOCERINA Macq.

- D. lacteipennis* Loew. Cape May VI, 14.
D. magna Coq. Riverton VIII, 17.
D. parva Loew. Ashland V, 13 (Hk).
D. simplex Loew. Trenton VIII, 23, Manahawkin IX, 5 (Hk).

HYDRELLIA Desv.

- H. scapularis* Loew. Trenton VII, 21 (Hk); Riverton IX, 19 (Jn); Manahawkin IX, 5.
H. valida Loew. Cape May VI, 4 (Vk).
H. hypoleuca Loew. Trenton VIII, 21 (Hk); Avon IX, 27.
H. cruralis Coq. Riverton IX, 19 (Hk).

PELINA Haliday.

- P. brevis* Walk. Ashland VI, 22 (Hk).

HYADINA Halid.

- H. rufipes* Meig. Trenton VIII, 23 (Hk).

OCHTHERA Latr.

- O. mantis* DeGeer. Camden VII, 1 (Kp); Clementon V, 30 (Jn); Anglesea VIII, 5 (Hk); Cape May IX, 21 (Dke).

BRACHYDEUTERA Loew.

B. argentata Walk. Riverton VIII, 3 (Jn); Cape May VIII, 20 (Vk).

PARYDRA Stenhammer.

P. bituberculata Loew. Dunnfield VII, 15 (Jn); Riverton IV, 26 (CG).

P. pinguis Walk. Shark River VII, 12.

P. quadrituberculata Loew. Manahawkin IX, 5 (Hk); Cape May VI, 4 (Vk).

P. imitans Loew. Near Anglesea Junction VI, 25 (Vk).

P. breviceps Loew. Manahawkin IX, 5 (Hk).

EPHYDRA Fallen.

E. subopaca Loew. Long Branch VI, 12, Ocean City V, 7, Wildwood VII, 12 (Jn); Cape May (Dke).

E. nana Walk. Cramer Hill VIII, 24, Riverton X, 9.

SCATELLA Desv.

S. stagnalis Meig. Newark XII, 7 (Wdt); Trenton VIII, 23 (Hk); Iona IX, 12 (CG); Avalon VII, 22.

S. flavillacea Loew. Cape May VI, 14.

S. oscitans Walk. Clementon V, 14 (CG).

S. callosicosta Cress. Seaside Park V, 16 (Vk).

S. lugens Loew. Riverton X, 9.

CÆNIA Desv.

S. spinosa Loew. Trenton VIII, 21 (Hk); Ocean Co. V (Sm); Anglesea VII, 19, Cape May VI, 22.

C. fumosa Sten. Cape May IX, 17, at light (Vk).

CANACE Haliday.

C. snodgrassii Coq. Atlantic City V, 6.

LIPOCHÆTA Coq.

L. slossonæ Coq. Anglesea VII, 19, Cape May VI, 6.

Family OŚCINIDÆ.

The "frit flies." They are small, bare species, with hemispherical head, flat front, short antennæ, short wings and ovate or elliptical abdomen. The legs are short and moderately stout. They are often colored or banded, and are common in grass and meadow lands. The larvæ live in the stems of grasses of all kinds, and may become locally injurious.

MEROMYZA Meigen.

M. americana Fitch. Infests wheat and other grasses; common throughout the State V-VIII, but thus far not injurious.



Fig. 335.—*Meromyza americana*, the stem maggot fly.

CHLOROPS Meigen.

C. versicolor Loew. New Brunswick, Anglesea V, 28 (Sm); Jamesburg VII, 4, Atco VII, 9 (Jn); Clementon V-VIII (div).

C. nigripes Coq. Trenton VIII, 21, Manahawkin IX, 5 (Hk).

C. crocota Loew. Newark V (Wdt); Clementon VIII, 6.

C. rufescens Coq. Trenton VIII, 21, Riverton VII, 18 (Hk).

C. sulphurea Loew. Trenton V, 20, Ashland VII, 15, Clementon V, 30 (Hk); Atco VI, 4, VII, 9.

C. confluens Loew. Trenton VIII, 19 (Hk).

C. grata Loew. Del. Water Gap VII, 12, Princeton VII, 21.

C. assimilis Macq. Newark, Ocean Co. V (Sm); Trenton V, 20, Ashland V, 13 (Hk); Riverton X, 9, Princeton VII, 21, Clementon V, 9, Anglesea VII.

C. subnigra Coq. Manahawkin IX, 5 (Hk).

C. procera Loew. Del. Water Gap VII, 11, Asbury Park VIII, 16, Clementon VIII, 8.

C. eucera Loew. Jamesburg VII, 4.

C. unicolor Loew. Trenton V, 20 (Hk); Princeton VII, 21, Riverton V, 14, Westville VII, 12, DaCosta VII, 30.

C. variceps Loew. Ocean Co. V (Sm).

C. obscuricornis Loew. Atco VI, 4, 18.

C. melanocera Loew. Riverton V, 14 (Jn); Ashland V, 13, Clementon V, 30 (Hk).

C. proxima Say. Trenton V, 20, Iona V, 16 (Hk); Lucaston V, 28, Brown's Mills V, 21 (Dke).

C. pulverea Coq. Merchantville V, 26 (Dke).

HIPPELATES Loew.

H. plebejus Loew. DaCosta VI, 4 (Dke); Clementon V, 12, VIII, 8, Avalon VI, 9 (Jn); Anglesea V, 28 (Sm).

H. nobilis Loew. Shark River VII, 12, Avalon VI, 9, 30.

H. flavipes Loew. Shark River VII, 12, Riverton IX, 11 (Jn); Laurel Springs VI, 13, Brown's Mills VII, 1 (Dke).

- H. pusio* Loew. Riverton V, 14, X, 9 (Jn); Trenton VIII, 23, Ashland V, 13 (Hk).
H. plumbellus Wied. Riverton V, 14.
H. bicolor Coq. New Brunswick VII (Sm).
H. stramineus Loew. Riverton IX, 11 (Jn); Lakehurst VII, 7 (Coll).
H. microcentrus Coq. Mt. Holly III, 17, Brown's Mills VI, 9 (Dke); Ashland VI, 22 (Hk); Anglesea V, 28 (div).

ELACHIPTERA Macq.

- E. eunota* Loew. Trenton VII, 5 (Hk); Avalon VI, 30.
E. nigriceps Loew. Shark River VII, 12, Riverton VII, 3, Clementon V, 30; bred from Lotus infested by "*Pyrausta nelumbialis*" VII, 13.
E. costata Loew. New Brunswick VII, 20, Ocean Co. V (Sm); Princeton VII, 21 (Jn); Merchantville XI, 16 (Dke).
E. formosa Loew. Riverton IX, 8.
E. longula Loew. Clementon VI, 3.

MOSILLUS Latr.

- M. æneus* Fall. Avon IX, 27 (Hk).

SIPHONELLA Macq.

- S. cinerea* Loew. Riverton X, 9, Cramer Hill VIII, 24 (Jn); Ashland VII, 15 (Hk); Brown's Mills IX, 16 (Dke).
S. pumilionis Bjerk. Riverton VII, 3.
S. inquilina Coq. Manumuskin X, 8 (Dke); Clementon X, 3, Iona IX, 12 (CG); Manahawkin IX, 15 (Hk).

OSCINIS Latr.

- O. carbonaria* Loew. Ocean Co. V (Sm); Avon IX, 27 (Hk).
O. trigramma Loew. Shark River VII, 12 (Jn); Lucaston IX, 15 (Dke); Anglesea V, 28 (Sm).
O. coxendix Fitch. Riverton X, 9 (Jn); Lucaston IV, 4 (Dke); Avon IX, 27 (Hk).
O. soror Macq. Riverton IV, 8 (Dke); Ocean Co. V (Sm).

Family DROSOPHILIDÆ.

The species in this family are small, plump, without pile, the bristles of the head and legs conspicuous. Abdomen usually short and broad, genitalia not prominent, colors tending to yellow. They are often abundant about decomposing or fermenting fruit, about cider-mills, wine-presses, etc., whence they are called "pomace flies." The larvæ live in this pomace and on the surface of the scum of the fermenting fruit juice.

PHORTICA Schiner.

- P. vittata** Coq. Del. Water Gap VII, 12, Avalon VI, 8 (Jn); Anglesea V, 28 (Dke).
P. leucostoma Loew. Dunnfield VII, 8, 12, Dover VII, 16 (Jn); Delair VIII, 18 (Dke).
P. humeralis Loew. Riverton VII, 30, Westville VII, 26.

STEGANA Meig.

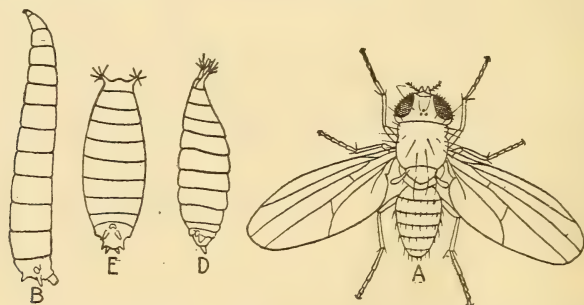
- S. coleoptrata** Scop. Delaware Water Gap VII, 13.

CURTONOTUM Macq.

- C. helvum** Loew. New Brunswick VII, 7 (Sm); Princeton VII, 21, Westville VII, 26, VIII, 23, Atco VII, 9 (Jn); Riverton IX, 26 (CG); Stone Harbor VIII, 3 (Dke).

DROSOPHILA Fallen.

- D. amœna** Loew. Westville VII, 21, Glassboro VIII, 28 (GG); Merchantville XI, 16 (Dke).



Pommace fly; *Drosophila ampelophila*: a, adult; b, larva; c, d, pupa.

Fig. 336.

- D. ampelophila** Loew. Common "fruit" or "vinegar fly"; everywhere in the State after midsummer.
D. funebris Fab. Riverton VI, 1.
D. quadrimaculata Walk. Del. Water Gap VII, 12, Merchantville VI, 28 (Jn); New Brunswick VII, 20 (Sm).
D. graminum Fall. Trenton V, 24, Clementon VII, 4 (Hk); Anglesea V, 28 (W).
D. adusta Loew. New Brunswick VII, 20 (Sm).
D. confusa Stæger. Delaware Water Gap VII, 13.
D. colorata Walk. Dunnfield, Del. Water Gap VII, 15.
D. punctulata Loew. Glassboro X, 17 (CG).
D. maculosa Coq. Riverton IX, 23.

- D. inversa** Walk. Avalon VI, 8.
D. ordinaria Coq. Riverton VIII, 4.
D. multipuncta Loew. Cape May IX, 23 (Vk).
D. varia Walk. Riverton VI, 15, Newbold VII, 4 (Dke); Lucaston IX, 9 (Hk).
D. tripunctata Loew. Newbold VII, 4, Merchantville XI, 16 (Dke).
D. quinnaria Loew. Merchantville XI, 16 (Dke).
D. phalerata Meig. Trenton VIII, 21 (Hk).
D. valida Wlk. Manahawkin VII, 5 (Hk).

Family GEOMYZIDÆ.

Small or even minute flies with comparatively large wings. The antennæ are short, arista variable, front broad and bristly below the apex. The larvæ, so far as known, live in the stems of plants.

DIASTATA Meig.

- D. pulchra** Loew. "New Jersey" (A E S).
D. nebulosa Fall. Clementon V, 16.

ISCHNOMYIA Loew.

- I. albicosta** Walk. (vittula Loew.) Dunnfield VII, 12, Princeton VII, 21, Westville VII, 2.

ANTHOMYZA Fallen.

- A. variegata** Loew. Del. Water Gap VII, 12 (Jn); New Brunswick VI, 1, Ocean Co. V (Sm).
A. terminalis Loew. Trenton V, 24 (Hk).

SCYPHELLA Desv.

- S. flava** Linn. New Brunswick (Sm).

Family AGROMYZIDÆ.

Consists of small or minute flies difficult to separate from the allied groups. The front is broad, the antenna short, arista absent, or, when present, bare or only pubescent. The wings are broad, venation resembling that of the allied families. The larvæ vary greatly in habits: some are leaf miners, some feed upon plant lice, others occur in galls in which their function is not yet well understood.

NAPOMYZA Haliday.

- N. chrysanthemi** Kowarz. Newbold VII, 4 (Dke). Larva is a leaf-miner in Chrysanthemum.

CERATOMYZA Schiner.

C. dorsalis Loew. Riverton V, 14, VII, 3, X, 10.

AGROMYZA Fallen.

A. coronata Loew. Ashland V, 13 (Hk); Avalon VII, 22 (Jn).

A. melampyga Loew. Jamesburg VII, 4.

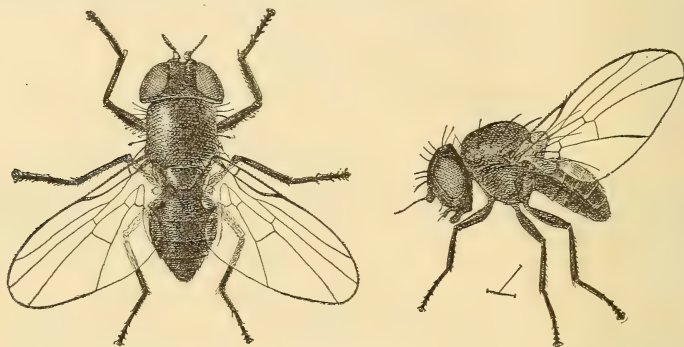


Fig. 337.—*Agromyza simplex*, from above at left and from side at right.

A. simplex Loew. Chester IX, 5 (Coll); Newark VI, 13, Riverton VII, 24, Atco VI, 4 (Jn); Ashland V, 13 (Hk); larva mines in asparagus.

A. angulata Loew. Del. Water Gap VII, 8, Newark VI, 13.

A. æneiventris Fall. Trenton VIII, 11, Pemberton VII, 8 (Hk); Westville VII, 21; larva burrows in roots of clover.

A. dimidiata Walk. Ocean Co. V (Sm); a leaf-miner of cabbage.

A. magnicornis Loew. Riverton VII, 17; a leaf-miner of Iris.

A. parvicornis Loew. Trenton V, 20 (Hk); Riverton VI, 20.

A. jucunda V. d. W. Riverton IX, 17; larva mines in verbena, aster, etc.

A. viridula Coq. National Park V, 6 (Dke).

PHYLLOMYZA Fall.

P. securicornis Fall. Trenton VIII, 21 (Hk).

DESMOMETOPA Loew.

D. m-nigrum Zett. New Brunswick VIII, 26 (Sm).

D. halteralis Coq. Clementon V, 12, Anglesea VII, 19.

D. latipes Meig. Chester IX, 3 (Sm); Clementon X, 18 (Hk).

RHICNOESSA Loew.

R. albula Loew. Wildwood VIII, 27, Avalon VII, 19 (Hk); Stone Harbor VIII, 3-12 (Dke).

EUSIPHONA Coquillett.

E. mira Coq. Del. Water Gap VII, 10, Bamber IX, 1 (Dke).

RHYNCHOMILICHIA Hendel. (LOBIOPTERA Wahlb.)

R. indecora Loew. Atco VI, 6, Woodbury VI, 7, Buena Vista VI, 11, Avalon VI, 9.

MILICHIELLA G-Tos.

M. lacteipennis Loew. Brown's Mills VI, 22 (Dke); Avalon VI, 9.

M. bisignata Coq. Riverton VII, 4.

M. arcuata Loew. Riverton VIII, 25, Anglesea IX, 2 (Jn); Lucaston VIII, 10 (Dke).

TRAGINOPS Coq.

T. irrorata Coq. "New Jersey."

LEUCOPIS Meig.

L. simplex Loew. Riverton VI, 19, Clementon VIII, 6, Avalon VI, 9, VII, 22.

L. nigricornis Egger. Del. Water Gap, bred VII, 20, from willow galls collected VII, 11 (Jn).

OCHTHIPHILA Fallen.

O. polystigma Meig. Newark V (Sm); Trenton V, 20, Ashland VII, 15 (Hk); Westville VII, 21 (Jn); Egg Harbor VII, 10 (Coll).

O. elegans Panzer. Clementon V, 30.

Sub-order PUIPARA.

The term really explains its own meaning, though perhaps the name "louse-flies" may appeal more strongly to the imagination.

The insects are flattened, adapted to live among wool or feathers, and infest chiefly birds of prey. Among animals the sheep only is infested by a "tick," which is really a degraded, wingless member of this family. They are termed pupipara because the larva remains in the body of the mother until it is mature and ready to enter the pupal stage.

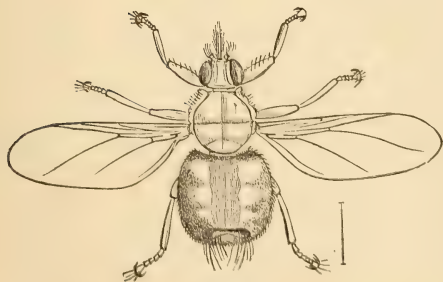
Family HIPPOBOSCIDÆ.**ORNITHOMYIA** Latr.

Fig. 338.

Fig. 338.—A bird fly, *Orfersia* species: enlarged.



Fig. 339.

Fig. 339.—Bee louse: *Braula* species: much enlarged.

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- O. anchineuria* Speiser. (*pallida* Say.) On the reedbird IX, 2, and red-winged blackbird VIII, 19, shot by Mr. Chas. Liebeck along the Delaware River.

OLFERSIA Wied.

- O. americana* Leach. On the red-tailed hawk XI, 9, Haddonfield; it also frequents the great horned owl and screech owl.
- O. ardeæ* Macq. On American bittern IX, 15, 21, X, 10, and night heron X, 15, shot by Mr. Chas. Liebeck along the Delaware River; little blue heron, Bristol Island, Delaware River (Fowler).

PSEUDOLFERSIA Coq.

- P. maculata* Coq. Cape May VIII, from a fish hawk (Sk); Lahaway IV, 1, several specimens from fish hawk, by J. Turner Brakeley.

MELOPHAGUS Latr.

- M. ovinus* Linn. The "sheep louse-fly"; infests sheep everywhere.



Fig. 340. — "Sheep tick:" *Melophagus ovinus*: enlarged.

Alphabetical Index to Localities.

- Albion**, Camden County; Pine Barrens: three and one-half miles west of Atco. Scrub and pine land, with pine and cedar swamps to the south.
- Allaire**, Monmouth County; Pine Barrens: just west of the marshy shore meadows, north of Lakewood, southeast of Freehold.
- Alloway**, Salem County; Delaware Valley: good, well-cultivated country, with scrub pine and other woodland surroundings.
- Almonesson**, Camden County; southeast of Woodbury, on Almonesson Creek. Low, somewhat marshy and scrubby land, with a considerable pond.
- Alpine**, Bergen County; Highlands: on the Hudson, about four miles south of the State line. Rocky, wooded country.
- Ancora**, Camden County; Pine Barrens: about three miles north of Winslow. Scrub and swamp, with cranberry bogs on the Pump branch.
- Andover**, Sussex County, about five miles south of Newton; Appalachian, just beyond the Highlands: hilly, wooded country, with extremes of a little over 700 feet. Small ponds filled by little brooks near by.
- Anglesea**: see **Five-Mile Beach**.
- Arlington**, Piedmont Plains: or **Arlington Meadows**, Delaware Valley, Essex County. A short distance east of Newark, at the edge of the Hackensack meadows, where most of the collecting was actually done.
- Asbury Park**, Monmouth County; Delaware Valley and Maritime: means generally the ocean front and washed up material; but there is good collecting ground in the coniferous woodland west of the town.
- Ashland**, Camden County; Delaware Valley. Three miles east of Hadonfield on the Camden and Atlantic R. R.
- Atco**, Camden County; Pine Barrens. Scrub land; mostly conifers, light sandy soil, cedar and cranberry swamps.
- Atlantic City**, Atlantic County; Coastal and Maritime. On an island made up of sand dunes, with reedy grasses rising from the ocean front to a central back-bone and dropping off at the west to a broad marsh which becomes flooded at unusually high water. Much of the collecting was done along the shore in times past, of material washed up by the sea, and little has been done of late years.
- Atlantic County**. Means usually the pine barrens.
- Atlantic Highlands**, Monmouth County; Delaware Valley. A high ridge at the land end of Sandy Hook, overlooking the ocean and Raritan Bay. Rolling scrub land with little high wood and much bush, merging into swampy meadows back of the ridge and along shore.
- Atsion**, Burlington County; Pine Barrens. Surrounded by cranberry and cedar swamps, on Atsion Creek.

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- Avalon**, Cape May County. On the ocean front, south of Sea Isle City, and much like it in character.
- Avon**, Monmouth County, Delaware Valley. Between Belmar and Bradley Beach. Very like Asbury Park.
- Bamber**, Ocean County; Pine Barrens. Mr. Daecke has taken many interesting species here.
- Bargaintown**, Atlantic County; Pine Barrens. On the pond at the head of Patcong Creek, which empties into Great Egg Harbor near Somers Point. Scrub and swamp land.
- Barnegat**, Ocean County. Situated on a strip of the Delaware Valley region between the Maritime and the pine barrens.
- Barnegat Bay Dist.** Includes all that region on both sides of Barnegat Bay from Bay Head to Barnegat Bay Junction. It is largely in the Coastal Strip but small areas of Delaware Valley formation are on the sand bars to the east of the Bay, and the mainland to the west of the marsh is also of this formation. Where cited it usually means Barnegat, Manahawkin or the sand bar between Barnegat City and the Junction.
- Barnegat City**, Ocean County. On the sand bar just south of Barnegat Inlet; a small ridge of Delaware Valley formation with salt marsh and sand on either side.
- Basking Ridge**, Somerset County; Piedmont Plain. Good farming country, little deciduous forest.
- Bayside**, Cape May County; Coastal Strip. On the Delaware Bay side of the Cape May peninsula, southwest of Cape May Court House. Pine and oak scrub land; beaches sand, gravel or mud.
- Beach Haven**, Ocean County. On Long Beach, fronting the ocean. A narrow, sandy island backed by tide marsh to Little Egg Harbor.
- Beesley's Point**, Cape May County; Coastal region. On the south shore of Great Egg Harbor opposite Somers Point. A low sand spit with tide marsh on either side.
- Belleplain**, Cape May County; Pine Barrens. Mostly typical scrub land with an admixture of cedar and cranberry swamps.
- Belleville**, Essex County; Piedmont Plain. At the junction of the Passaic and Second River, just north of Newark, on rising land.
- Bellport**, Long Island. A few species, chiefly saw-flies, are cited from this and other localities on Long Island by Dr. Dyar, where the food plant occurs in similar situations in New Jersey.
- Belmar**, Monmouth County; Coastal and Delaware Valley regions. On the coast, with the usual scrub back of the ocean at this region.
- Belvidere**, Warren County; Appalachian. Hilly land with deciduous forests.
- Bergen**, Hudson County; Delaware Valley. A section of Jersey City lying to the northwest, and at present almost entirely in city lots.
- Bergen Hill**, Middlesex County, about one mile from South Amboy in the brick and clay beds. The chances are that Bergen Point, in Hudson County, was intended by Hagen in his citations of this locality.

- Bergen Point**, Hudson County; Delaware Valley. On the southern point of the Bayonne Peninsula, just opposite Staten Island.
- Berkeley Heights**, Union County; on the edge of the Piedmont Plain bordering the Watchung range. Rolling and somewhat hilly with deciduous woodland and small streams.
- Berlin and West Berlin**, Camden County; Pine Barrens. About two and one-half miles northwest of Atco, at the edge of the pine and scrub land.
- Beverly**, Burlington County; Delaware Valley. Well cultivated diversified, somewhat rolling, light soils, with patches of deciduous woodland.
- Big Timber Creek**, Camden County. Originates in the Pine Barrens near Sicklerville, flows through Delaware Valley formation, emptying in the Delaware River south of Gloucester.
- Blackwood**, Camden County; Delaware Valley close to Pine Barrens. On big Timber Creek, in swamp and pine land.
- Bloomfield**, Essex County; Highlands. In the rolling country at base of first ridge of Orange Mountains; well cultivated and most of the collecting done along the roads on the wooded slopes or in a few neglected fields.
- Boonton**, Morris County; Highlands at edge of Piedmont Plain. On the Rockaway River, in a hilly country varying from 400 to 900 feet elevation.
- Bordentown**, Burlington County; Delaware Valley. On the Delaware where there are swampy meadows along shore, rising rather abruptly; the country well settled and cultivated, with little, mostly deciduous, woodland.
- Bound Brook**, Somerset County; Piedmont Plain. On the Raritan River, at the base of rising ground, over rolling fields, through which the brook and one or two other little streams find their way into the river. Not much woodland.
- Branchville**, Sussex County; Appalachian. Rough, hilly country, with deciduous woodland near rapid streams, locally forming ponds.
- Brigantine Beach**, Atlantic County; Coastal and Maritime. A few miles north of Atlantic City and similar in character. Has a stretch of marshy meadow to the west and the usual sand dunes with reedy grasses toward the sea. Practically all the citations from this point are by the late Dr. John Hamilton.
- Brigantine Mainland**, Atlantic County; Delaware Valley. Means the narrow strip of highland at the edge of the salt marsh just west of Brigantine Beach.
- Bridgeport**, Gloucester County; Delaware Valley. Situated on Raccoon Creek about two miles from the Delaware River.
- Bridgeton**, Cumberland County; Delaware Valley on the edge of the Pine Barrens. On Cohansey Creek, where there is marsh and swamp, bordered by a level, well cultivated country about which is considerable scrub and woodland. A good collecting ground.
- Bristol Island**, Delaware Valley. A small island in the Delaware River, between Bristol and Burlington.

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Bronx Park, New York City. A few species are cited from this locality, mainly by Dr. Dyar, where the food plants occur in similar situations in New Jersey.

Brookhaven, Long Island. See Bellport.

Brookville, Ocean County: Pine Barrens. Near East Plains, and much the same sort of territory.

Brown's Mills or Brown's Mills Junction, Burlington County: Pine Barrens. Typical scrub land, rising from the junction to the Mill, where there is a stream between gravelly hills of the Delaware Valley type.

Budd's Lake, Morris County: Highlands. About one by one and one-half miles at extremes, four miles northeast of Hackettstown.

Buena Vista, Cumberland County: Delaware Valley. Pine barrens, with scrub oak ridges and sphagnum swamps. Mr. Liebeck has been the chief collector here so far as records go. About five and one-half miles north of Vineland.

Burlington, Burlington County: Delaware Valley. Varies from swampy meadows along the river and creek, to alluvial levels, well cultivated and with only scattered patches of deciduous woodland.

Burlington County. Rather indefinite, but usually means the pine barrens.

Caldwell, Essex County: Piedmont Plain. West of Montclair beyond the second ridge of the Orange Mountains, in a broken, hilly country, with considerable woodland of deciduous trees.

Camden, Camden County: Delaware Valley. Most of the species so cited came from the marshes or lowlands along the Delaware River and Cooper's Creek.

Camden County. Covers a great range of territory from the river valley to the pine barrens. Most of the species so cited are probably nearer to Atco than to Camden.

Cape May, Cape May County: Coastal region with Maritime on the south and Delaware Valley on the west. Seashore, marsh, mud flats and sand dunes, with a backing of scrub, sweet bay, beach plum and the like.

Cape May County. Low lying territory with pine region in the north, an arm of which extends southward into the peninsula. A strip of Delaware Valley formation extends on both sides of the pines and runs down to the end of the cape bordered on each side by a broad strip of coastal region and finally the Maritime.

Cape May Court House, Cape May County: Pine Barrens. Pine and scrub land with dense thorny underbrush and some swamp land.

Carlstadt, Bergen County: Piedmont Plain at edge of Delaware Valley. At the edge of the Hackensack meadows, about two miles southeast of Passaic.

Cedar Grove, Ocean County: Pine Barrens. On east branch of Wading River, close to both the east and west plains; cedar swamp and pine land.

Cedar Lake, Warren County: Appalachian. About one mile from Blairs-town at an elevation of about 350 feet.

- Central Park**, New York City: see Bronx Park.
- Chester**, Morris County: Highlands. A hilly country with deciduous woodland and rapid brooks: Schooley's Mountain a few miles west.
- Chews Landing**, Camden County; Delaware Valley. About four and one-half miles east of Woodbury.
- Chimney Rock**, Somerset County: Highlands. An abrupt cliff, about 400 feet, overlooking Middle Brook, three miles east of Somerville.
- Clayton**, Gloucester County: Pine Barrens. About three miles south of Glassboro; in the pine and scrub oak country.
- Clementon**, Camden County; Pine Barrens, twelve miles southwest of Camden.
- Clifton**, Passaic County; Piedmont Plain; between Paterson and Passaic. Meadow with little clumps of woodland, most of the collecting done along Weasel Brook. Now almost all built over.
- Cold Spring**, Cape May County; Pine Barrens. A few miles north of Cape May City.
- Collingswood**, Camden County: Delaware Valley. About four miles southeast from Camden. Well cultivated, with scattered, deciduous woodland.
- Cologne**, Atlantic County: Pine Barrens. A few miles southeast of Egg Harbor. Scrub land, with cedar swamps.
- Communipaw**, Hudson County; Delaware Valley. Southern end of Jersey City.
- Corson's Inlet**, Cape May County; Coastal strip. At the north point of the narrow island on which Sea Isle City is located and much the same country.
- Cramer Hill**, Camden County, near Camden City; Delaware Valley: Deciduous woodland to the river bank meadows.
- Cranberry Bogs**. Species so cited were, with rare exceptions, taken by me, late in May, when the bogs were reflowed, forcing the insects out of their retreats, the wind driving them into one corner, where they were collected in great numbers.
- Canford**, Union County; Piedmont Plain. Well settled region with cultivated fields and deciduous woodland.
- Culver's Pond**, Sussex County; Appalachian. Northwest of Branchville, at base of Kittatinny Mountains, elevation 850 feet.
- Cumberland County**; means generally the pine barren region.
- DaCosta**, Atlantic County: Pine Barrens. Light sandy soil, with scrub oak land and coniferous woods, much ravaged by fire.
- Delair**, Camden County; Delaware Valley. Much swamp land backed by open deciduous woodland.
- Delaware Water Gap**, Warren County: Appalachian. This means the shore of the Delaware, opposite the Pennsylvania town of that name, extending along the base of the mountains on the New Jersey side and along the carriage and railroad in both directions. The country is rocky and broken, with plenty of water in ordinary seasons and numerous flowers, *Ceanothus*, *Spirææ*, etc. Several collectors have cited the place, but more species have been taken by Mr. C. W. Johnson than anyone else.

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- Dennisville**, Cape May County: Delaware Valley. An old town on the narrow ridge between the pines and the salt marshes on the banks of the Dennis River.
- Denville**, Morris County; Highlands. Hilly, rocky country, covered almost entirely by deciduous woodland.
- Dover**, Morris County: Highlands. Hilly with wooded slopes, and valleys with more or less rapid brooks. Good collecting country.
- Dunellen**, Union County: Piedmont Plain. At base of the Orange Mountains, west of Plainfield; good rolling country, rising to the north, with swamp, brooks and woodland in the vicinity.
- Dunker Pond**, Passaic County; Highlands. About six miles southeast of Franklin; elevation a little over 1,000 feet.
- Dunnfield**, Warren County; Appalachian. Generally cited with the Delaware Water Gap. The collecting here was all done along the line of Dunnfield Creek and on the sides of Mt. Tammany, in the open glades and along the rocky banks and bed of the creek. Mr. Johnson has given most of the citations here.
- Dunnfield Creek**, = Dunnfield.
- Eagle Rock**: Highlands. A prominent point on the first ridge of the Orange Mountains, west of Montclair, Essex County; well wooded.
- East Plains**, Ocean County; Pine Barrens. A few miles west of Barnegat: scrub land.
- Echo Lake**, Passaic County = Macopin Lake: q. v.
- Edgewater Park**, Burlington County: Delaware Valley. Well cultivated land in truck and orchards.
- Egg Harbor**, = Egg Harbor City.
- Egg Harbor City**, Atlantic County: Pine Barrens. Gravelly and a little rolling to the north, sandy and more level to the south; much fruit and vineyards; but also much pine and scrub land, with the usual admixture of swamp vegetation.
- Eldora**, Cape May County: Pine Barrens. Ten miles northwest from Cape May C. H.; at the edge of the pines, tending toward the Bay Shore marshes.
- Elizabeth**, Union County: Piedmont Plain at edge of Delaware Valley. Marshy meadowland toward the shore and along it; cultivated ridges to the north and west; with some low, mostly deciduous woodland.
- Englewood**, Bergen County: Highlands. On the west slope of the Palisades. Small creeks in the vicinity, forming ponds.
- English Creek**, Atlantic County: Pine Barrens. A small creek entering the Great Egg Harbor River north of Mays Landing.
- Englishtown**, Monmouth County: Delaware Valley. Four miles northwest of Freehold; rather hilly or rolling, with deciduous and some coniferous woodland.
- Fairmount Cemetery**, in the City of Newark.
- Farmingdale**, Monmouth County: Delaware Valley. About seven miles southeast of Freehold: flat, scrubby country, with two small streams along which are cranberry bogs.

- Five-Mile Beach**, Cape May County. Includes Anglesea at the north, Wildwood and Holly Beach at the south. On the shore strip, an island varying from one-quarter to three-quarters of a mile in width, with a backbone of Delaware Valley formation and a fringe of holly, beach plum and marine flora. There is every range from oak to pine and from salt marsh to cedar, and Sphagnum swamp. The flora is varied and the insect fauna correspondingly rich. Improvements, filling and draining, are rapidly destroying the characteristic fauna. Has been one of the most prolific collecting grounds in the State.
- Flatbush**, Long Island; several times cited for species whose occurrence in New Jersey is practically certain.
- Florence**, Burlington County; Delaware Valley. Fertile rolling country along the Delaware River.
- Formosa Bog**, Cape May County; Pine Barrens. Three miles south of Tuckahoe, on a branch of the Cedar Swamp Creek.
- Forest Hill**, Essex County; Piedmont Plain. On the Second River, just north of Newark. Hemlocks with a sprinkling of oak, chestnut and beech.
- Fort Lee**, Bergen County; Highlands. Means usually the base or wooded slopes of the Palisades at that point. The country is rough and stony, the forests are deciduous.
- Fort Lee District**; Highlands. Means usually the Palisades from Guttenberg northward to Coytesville.
- Franklin Furnace**, Sussex County. On the border between the Highlands and the Appalachian region. Rough, stony country with deciduous woodland and clear streams.
- Freehold**, Monmouth County; Delaware Valley. A rich, well cultivated country; some deciduous and coniferous woodland to the west.
- Frenchtown**, Hunterdon County; Piedmont Plain. On the Delaware River, the land rising to elevations of 400 feet within a mile or two east.
- Garrett Mt.**, Passaic County; Highlands. The northeastern end of the First Watchung Mountain, covered with deciduous and some hemlock forest.
- G. D.** Generally distributed: means that the species has been found in so many places and so often that the conclusion is fair that it occurs wherever the food conditions are favorable. Cited by a Philadelphia man it means the lines between Camden and Atlantic City or those between Camden and Cape May. Cited by a Newark man it is equivalent to "Newark district." To a New York collector it means the range between Greenville and Fort Lee. Cited by me it means the State at large.
- Gibbs Hill Pond**, Salem County; Pine Barrens. Four and one-half miles southwest of Alloway, in scrub land. Elevation twenty-two feet.
- Glassboro**, Gloucester County; Pine Barrens. In the pine district, with scrub oak fields and small swamps, interspersed.
- Glen Ridge**, Essex County; Highlands. Between Montclair and Bloomfield, and like them in character.

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Gloucester, Camden County: see introductory remarks.

Good Intent, Gloucester County: Delaware Valley. Just west of Blackwood, on the south branch of Timber Creek, which widens into ponds to the south.

Grantwood, Bergen County: Highlands. On the Palisades and similar to Fort Lee.

Great Cedar Swamp, Cape May County: Pine Barrens. Low scrub land around the swamp.

Great Egg Harbor, Atlantic County: Coastal Strip. Most of the collections at the edge of the marsh land.

Great Piece Meadow, Essex County: Piedmont Plain. Low grassy territory along the Passaic River, interspersed with wooded sections.

Greenville, Hudson County: Delaware Valley. On the narrow neck of highland just south of Jersey City, between Newark and New York Bays. Almost all laid out in building lots at present.

Greenwich, Cumberland County: Delaware Valley. On Cohansey Creek: mostly low land, which becomes marshy along the creeks and brooks.

Greenwood Lake, Passaic County: Highlands. A long narrow sheet of water between two parallel ridges, extending into New York State. The ground is rough and broken, the sides of the hills well wooded in most places.

Grenloch, Camden County, at edge of Pine Barrens. Two miles south of Blackwood.

Guttenberg, Hudson County: Highlands. On the Palisades, about three miles north of Hoboken. Most of the collecting was done along the banks of the Hudson or on the wooded slopes.

Hackensack, Bergen County: Piedmont Plain. On the Hackensack River about fifteen miles from its mouth. Low, level country with some marshy woodland and with open fields largely under cultivation.

Hackensack Meadows, Hudson and Bergen Counties. A great stretch of marsh land between the Palisades and the rising ground separating the Hackensack from the Passaic River. Gay in fall with acres of mallow.

Hackettstown, Warren County: Highlands. On the Musconetcong River at an elevation of about 500 feet, rising within a mile or two to 1,000 feet or more; slopes with deciduous woodland.

Haddonfield, Camden County: Delaware Valley. A rich, well cultivated district, with little, mostly deciduous, woodland, usually well elevated.

Hainesport, Burlington County: Delaware Valley. About three miles west of Mount Holly and in similar territory.

Haledon, Passaic County: Highlands. At the base of the Second Watchung Mountains. Hilly, rocky country covered with a deciduous woodland. In the valleys is a low shrubby growth with scattered trees and a little swampy territory.

Hamilton, Somerset County: Piedmont Plain. On the P. & R. R. R., about two miles west of Millstone. Level or rolling, well cultivated country.

- Hammonton**, Atlantic County: Pine Barrens. Large area in fruits, large and small, scrub land surrounding the cultivated area. Woodland both deciduous and coniferous of considerable extent, and swamps giving rise to small streams. Some territory in cranberries.
- Harris**, Burlington County: Pine Barrens. A flag station on C. R. R. of N. J., a few miles south of Chatsworth: pine scrub only.
- Harris Hill Pond**, Cumberland County: Pine Barrens. Six miles northwest of Bridgeton in pine and scrub land. Elevation fifty feet.
- Hasbrouck Heights**, Bergen County: Piedmont Plain. At the edge of the Hackensack Meadow. Low gravelly country with a few deciduous trees and much shrubbery.
- Helmetta**, Middlesex County: Pine Barrens. About two miles north of Jamesburg. The forests are not strictly pine woods, for there is considerable deciduous woodland with swampy territory covered by a low growth.
- Hemlock Falls**, Essex County: Highlands. Lies west of South Orange, beyond the crest of the first ridge. The country is rough; well wooded, a small stream forming rapids in a rather deep gully: some swampy ground in the hollows. A favorite collecting ground for the Newark entomologists.
- Hewitt**, Passaic County: Highlands. About two miles east of the southern end of Greenwood Lake, and of the same rocky country which characterizes the borders of that lake.
- High Bridge**, Hunterdon County: Highlands. On the south branch of Passaic River, rising to elevations above 400 feet; slopes wooded.
- Highlands**, see Atlantic Highlands.
- High Point**, Ocean County: Coastal Strip and Maritime, with an island of Delaware Valley formation. Situated on the sand bar between Barnegat City and Harvey Cedars.
- Hightstown**, Mercer County: Delaware Valley. Light soil, well cultivated, with scattered deciduous and some coniferous woodland: looks toward the pines.
- Hoboken**, Hudson County: Delaware Valley. Collecting grounds are west of the city in marsh or swamp, and at the base of the high ground on which part of the city is built: this locality and Jersey City Heights merge into each other.
- Holly Beach**: see 5-mile beach.
- Homestead**, Hudson County: Delaware Valley. At the edge of the low meadow west of West Hoboken.
- Hopatcong**, Morris County: Highlands: also cited as Lake Hopateong. Between Sparta and Green Pond Mountains, elevation over 900 feet. A rough, stony, more or less wooded country, in which several entomologists have collected.
- Hudson County**. Rather indefinite, but means mostly the base of the high ground back of Jersey City and Hoboken and about Snake Hill. This term is used mostly by Mr. Linell, and may extend north to Weehawken.

Hunterdon County: Piedmont Plain and Highlands. A rolling or hilly, sometimes rocky country, fairly well watered, with deciduous woodland and occasional groves of coniferous trees: rarely cited.

Husted, Cumberland County: Delaware Valley. Five miles north of Bridgeton at the edge of the Pine Barrens. Good farming country and quite generally under cultivation to the east.

Indian Creek, Atlantic County: Pine Barrens. About four miles north of Egg Harbor City, in pine and scrub land.

Iona, Cumberland County: Pine Barrens. Seven miles south of Glassboro and in the same general region.

Irrington, Essex County: Piedmont Plain. On the rising ground southwest of Newark, country mostly under cultivation.

Jamesburg, Monmouth County: Pine Barrens at the edge of the Delaware Valley formation. The collecting ground is on the line of the railroad to Old Bridge, around a series of cranberry bogs covering about 100 acres. There are groves of conifers as well as deciduous trees and much swamp land above and below the bogs. Ditches of considerable size regulate the water supply for the bogs. This is a meeting ground for the entomologists of New York, Newark and Philadelphia, so most of the contributors to the list include species from Jamesburg.

Jersey City Heights, Hudson County: Delaware Valley. Refers to the west slope of the ridge back of Jersey City and Hoboken, extending down to the meadows.

Kirkwood, Camden County: Delaware Valley. Four miles southeast of Haddonfield, on Cooper's Creek, with a considerable pond close by. At the edge of the scrub land.

Lacy, Ocean County: Pine Barrens. On the line of the Tuckerton Railroad about two miles southwest of Bamber.

Lahaway, Ocean County: Delaware Valley Island in the Pine Barrens. At the head of Lahaway Creek. The collecting ground is a basin, some thirty acres of which is in cranberries, ground rising on three sides. Surface soil sandy, mixed with clay. Pines on all sides, many deciduous trees. Huckleberry swamp partly edging bogs, in which are many magnolias. Flora very rich. Have taken a very large number of species of all orders, and many more have been taken by my good friend J. Turner Brakeley.

Lakehurst, Ocean County: Pine Barrens. Eight miles southwest of Lakewood, somewhat rolling, without great elevations. Much swamp land, some of it in cranberry bogs. Scrub oaks and pines predominate and the soil is mostly sandy. Has become a favorite collecting ground of late years, the remarkably rich flora being associated with an equally rich entomological fauna. Formerly known as Manchester.

Lakewood, Ocean County: Pine Barrens. In the pine district, but with more old open forest and less scrub land than usual. The ordinary

South Jersey sand is here, and a small lake gives variety to the landscape.

Landisville, Cumberland County: Pine Barrens. Five miles northeast of Vineland.

Laurel Springs, Camden County: Delaware Valley. About five miles south of Haddonfield: low wood and shrub land.

Lawnside, Camden County: Delaware Valley. A suburban settlement similar to Collingswood, six miles out of Camden.

Lenola, Burlington County, about one and one-half miles west of Moorestown, in similar country.

Linden, Union County: Piedmont Plain. Between Elizabeth and Rahway, on the Pennsylvania Railroad. Rolling country with low, deciduous woodland, stretching to salt marshes along the Arthur Kill.

Lindenwold, Camden County: Delaware Valley at edge of Pine Barrens. About five miles southeast of Haddonfield: similar to Berlin.

Linwood, Atlantic County. About four miles south of Pleasantville and situated on a narrow strip of the Delaware Valley region between the Pine Barrens and the Coastal Strip.

Little Falls, Passaic County: Piedmont Plain. About one and one-half miles southeast of Paterson, on the Passaic River.

Little Silver, Monmouth County: Delaware Valley. Near the shore, a level sandy country with little, low, mostly deciduous woodland.

Long Branch, Monmouth County: Delaware Valley. A narrow gravelly and sandy beach, backed by an abrupt highland, behind which is a good, well cultivated country: a little deciduous woodland.

Long Island. Some species are so cited, where the territory in which they were collected resembles that on the Jersey coast.

Longport, Atlantic County: Coastal Strip. On Absecon Island, south of and similar to Atlantic City.

Lucaston, Camden County: Pine Barrens. Seven miles southeast from Haddonfield, on the W. J. and Seashore R. R.: similar to Berlin.

Lyons Farms, Union County: Piedmont Plain. Between Newark and Elizabeth: a well-farmed country with swamp and some deciduous woodland.

Macopin Lake, Passaic County: Highlands. Ten miles north of Boonton, at western base of Kanouse Mt., 893 feet above sea level.

Madison, Morris County: Piedmont Plain. Hilly, well wooded locally, much under cultivation. Trees mainly deciduous.

Malaga, Gloucester County: Pine Barrens. On Scotland Run: has an admixture of deciduous trees among the oak and pine scrub.

Manahawkin, Ocean County: Delaware Valley at edge of Coastal Strip. Belongs to the maritime district, with swamp and scrub land back from the highland bordering the salt marsh.

Manasquan, Monmouth County: Delaware Valley. On the coast at the junction of pine barren and maritime district.

Manchester—now known as Lakehurst, q. v.

Manumuskin, Cumberland County: Pine Barrens. Typical scrub-land: but varied in character with very rich flora and insect fauna.

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- Maplewood**, Essex County; Highlands. About four miles west of Newark, on the south branch of the Rockaway River, elevation about 200 feet and rising in wooded slopes to the north.
- Marlton**, Burlington County: Delaware Valley; six miles east of Haddonfield. Among gravel and marl beds, with scrubby deciduous and coniferous woodland.
- Masonville**, Burlington County: Delaware Valley. Four and one-half miles west of Mt. Holly. Level to the lowlands of Mason's Creek, on which is a pond of considerable size: low deciduous and coniferous woodland.
- Mauricetown**, Cumberland County: Delaware Valley. On the Maurice River at edge of Coastal Strip; low, scrubby and swampy area.
- Mays Landing**, Atlantic County: Pine Barrens. Scrub, sand and swamps; an excellent collecting ground.
- Medford**, Burlington County: Delaware Valley. Well cultivated, level, fertile land.
- Merchantville**, Camden County: Delaware Valley. Four miles west of Camden. Deciduous woodland, somewhat rolling, with well cultivated farms and much fruit close by.
- Middlesex County**. Indefinite and rarely cited: it means usually the country a little to the south of New Brunswick.
- Milford**, Hunterdon County: Delaware Valley: four miles northwest of Frenchtown, on the Delaware River. Hills with slopes of deciduous woods to the north and east.
- Millburn**, Essex County: Highlands. At the terminal moraine: rocky, hilly country, well wooded and with some swampy territory.
- Millstone**, Somerset County: Piedmont Plain. On the Millstone River, rising to a gently rolling plain, well cultivated and with scattered deciduous woodland.
- Milltown**, Middlesex County: Piedmont Plain. About two miles south of New Brunswick, at the edge of the Pine Barrens, but with considerable deciduous and scrubby woodland.
- Millville**, Cumberland County: Pine Barrens. Scrub oak and pine with low meadows along the Maurice River.
- Monmouth County**. Rarely cited, and may mean anything from seashore to pine barrens.
- Monmouth Junction**, Middlesex County: Delaware Valley close to Piedmont Plain. Swampy woods and low meadow: trees mostly deciduous but also many conifers.
- Montclair**, Highlands. Rocky, hilly country covered by deciduous woodland.
- Moorestown**, Burlington County: Delaware Valley. On a fertile ridge, with low plains north and south, well cultivated country, with scattered patches of mostly deciduous woodland.
- Morgan**, Middlesex County: Delaware Valley. On the Raritan Bay one mile south of South Amboy. Rolling country, wooded or with a low scrubby growth, backed by salt marsh.
- Morris County**: Highlands and Piedmont Plain. Rarely cited: hilly or mountains, often rough, well watered country, with deciduous and some coniferous forest.

Morris Plains, Morris County: Piedmont Plain bordering the Highlands. About two miles north of Morristown. A plateau of about 425 feet rising to the north, east and west to hills of 600 feet or over. Slopes with deciduous woods.

Morristown, Morris County: Piedmont Plain. Low hills with wooded slopes and running streams; well cultivated, with considerable deciduous woodland.

Mountain View, Passaic County: Piedmont Plain. Five miles west of Paterson: rolling country, wooded and with swamps covered with brush and trees.

Mount Holly, Burlington County: Delaware Valley. On Rancocas Creek: ranging from low meadows to a considerable hill—the highest land in this part of the State. Generally cultivated, with some deciduous and coniferous woodland.

Mt. Pleasant, Cape May County: Pine Barrens: five miles south of Tuckahoe; elevation thirty feet; scrub land.

Mullica Hill, Gloucester County: Delaware Valley. Well cultivated, though light, rolling land with low, mostly deciduous woodland; some swamp along the course of Raccoon Creek.

National Park; = Red Bank, Gloucester County.

Navesink Highlands, = Atlantic Highlands.

Netherwood, Union County: Piedmont Plain. About one mile northeast of Plainfield and similar in character.

Newark, Essex County: Piedmont Plain bordering Delaware Valley. An unsatisfactory locality, including as it does the range from marsh forms at the south and east, to hill types at the north and west. This term means nothing uniform or definite except the geographical district.

Newark District. When this term is used it means that the species occurs in all the various kinds of localities about Newark.

Newbold, = Westville.

New Brunswick, Middlesex County: Piedmont Plain. At the edge of the red shale, which dips below the sand and clay a little to the south. Most of the species cited were collected by me in the immediate vicinity of the city. A very little collecting has been done on the banks of the Raritan.

Newfoundland, Morris County: Highlands. In the hills between Green Pond and Macopin Lake, elevation about 750 feet; nine miles southeast of Franklin Furnace.

"New Jersey." Some species are so cited because the specimens are so marked in the collections. They are relics of the period when State labels were considered all-sufficient, and usually they are rare forms. Occasionally, also, the actual locality becomes a little uncertain, though it is positive that the insect has been taken in the State.

New Lisbon, Burlington County: Pine Barrens. Just at the edge of the Delaware Valley; level, fairly cultivated country, with little water and low scrubby growth.

Newton, Sussex County: Appalachian. Mountainous country with deciduous woodland on the slopes.

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Newtonville, Atlantic County: Pine Barrens. Wild scrub land, about eight miles south of Winslow, with two cedar swamp streams that empty into Egg Harbor River.

Normanock, Sussex County: Appalachian. At Culver's Gap, in the Kittatinny Mts., three miles northwest of Branchville.

North Jersey. A general term applying to all that area north of the Delaware Valley region.

Nutley, Essex County: Piedmont Plain. On the Erie R. R., between Newark and Paterson, west side of Passaic River.

Nyack, New York. Just north of the New Jersey line, on the Hudson. The fauna is the same for several miles north and south of this point, and specimens taken here are almost sure to occur in New Jersey Highlands.

Oak Ridge, Passaic County: Highlands. Two and one-half miles west of Newfoundland and similar in character.

Ocean Beach, Monmouth County: Delaware Valley. On the shore, one mile north of Spring Lake: the usual maritime conditions on the beach, pine land to the west.

Ocean City, Atlantic County. On the seacoast, with the usual salt marshes toward Egg Harbor Bay.

Ocean County. Rather an indefinite locality, but means usually either Lakewood or Lahaway; both of them in the pines, so that the general character of the territory is the same.

Ocean Grove, Monmouth County: Delaware Valley. Adjoining and similar to Asbury Park, save that it has more woodland.

Ocean View, Cape May County: Delaware Valley. On the mainland, three miles northwest of Sea Isle City, just above the marsh land and at the beginning of the pine barrens.

Orange, Essex County: Highlands. A somewhat indefinite locality, as generally used, but means usually the rising ground at the base of the first ridge of the Orange Mts., where there is vegetation in great variety and much cultivated land, but also a few wooded patches and slopes. The forest trees are deciduous.

Orange Mts., = Watchung Mts.: Highlands. A somewhat indefinite term, but means generally the first range of hills back of South Orange and extending toward Montclair. The country is hilly, broken, quite well wooded and with many small brooks and streams. All the Newark collectors range in this territory.

Overbrook, Essex County: Highlands. Near Caldwell and much the same sort of territory.

Palisades: Highlands. Refers usually to the vicinity of Fort Lee, north and south.

Palmyra, Burlington County: Delaware Valley. Less than one mile south of Riverton and like it in character.

Pamrapo, Hudson County: Delaware Valley. On the New York Bay slope of the narrow peninsula, three miles south of Jersey City.

- Passaic**, Passaic County: Piedmont Plain. At the edge of the meadows, with marsh and swamp land; rising ground to the north.
- Passaic Valley**. An indefinite and unsatisfactory term: in the northern portion of the Piedmont Plain, extending on both sides of the Watchung Mountains, and greatly constricted at the Passaic Falls, Paterson, where it divides the first from the second Watchung Mountain range.
- Patcong Creek**, Atlantic County. About five miles long, runs south and west from a little pond into Great Egg Harbor just west of Somers Point, through pine and swamp land.
- Paterson**, Passaic County: Piedmont Plain. At the falls of the Passaic River, a broken, rocky country, with some deciduous woodland and rocky river shores with occasional sand banks.
- Peermont**, Cape May County; a Delaware Valley strip with coastal region each side. South of Sea Isle City and much like it.
- Pelham Manor**—see Bronx Park.
- Pemberton**, Burlington County: Delaware Valley near the edge of the Pine Barrens. Level, largely cultivated, with little woodland.
- Penbryn**, Camden County; Delaware Valley. On the Reading Railroad about nine miles south of Camden.
- Penns Grove**, Salem County: Delaware Valley. On the Delaware River, opposite Wilmington. Marshy along the river, cultivated, level land to the east.
- Perth Amboy**, Middlesex County: Delaware Valley. At the head of Raritan Bay. Sand and clay, rising somewhat to the north; swampy flats along the river, scrub land with little larger timber, conifers and deciduous, to the south and west.
- Petersburg**, Cape May County: Pine Barrens. Three miles southeast of Tuckahoe near Cedar Swamp Creek: scrub land.
- Philadelphia**. Some species collected near this city are cited where their general distribution is such that their occurrence in the Delaware River Valley is almost certain.
- Philadelphia Neck**. The low marshy meadows near the Delaware, south of the city. The species collected here will almost certainly occur in similar situations on the New Jersey side.
- Pitman Grove**, Gloucester County: Delaware Valley near edge of Pine Barrens. Level, well wooded with little water.
- Plainfield**, Union County; Piedmont Plain. On the rolling plain at base of Orange Mts., rising to the north and becoming stony and wooded at the hills, between which are small streams.
- Pleasant Mills**, Atlantic County: Pine Barrens. Eight miles north of Egg Harbor City, on the Mullica River, among a network of creeks and ponds.
- Pleasantville**, Atlantic County: Delaware Valley with Pine Barrens to the west. On the mainland, five miles northwest of Atlantic City, at the edge of the broad marsh separating it from the shore.
- Point Breeze**, given by Say as the type locality for "*Bellamira scalaris*." The nearest approach to this locality is "Sea Breeze," Salem County, on Delaware Bay, four and a half miles south of Greenwich.

- Point Pleasant**, Ocean County: Coastal Strip. At the mouth of the Manasquan River, with the usual salt marsh, sand dunes and other maritime characters.
- Port Norris**, Cumberland County: Delaware Valley on the edge of Coastal Strip, near the mouth of the Maurice River; between the pine barrens and the coast marshes.
- Port Republic**, Atlantic County: Pine Barrens. Six miles east of Egg Harbor City, on Nacote Creek, which widens here into considerable ponds. Scrub and swamp land.
- Pottersville**, Somerset County: Piedmont Plain close to the Highlands. Hilly country with deciduous woodland.
- Preakness Mountain**, Passaic County: Highlands. That part of the Second Watchung range extending from just west of Paterson to beyond Totowa. Rocky territory with deciduous and some evergreen trees.
- Princeton**, Mercer County: Piedmont Plain. Land well cultivated, with considerable low, deciduous woodland in the vicinity.
- Prosperstown**, Monmouth County: Pine Barrens. Five and a half miles northeast of New Egypt, just across the Ocean County line.
- Quick Pond**, Sussex County: Appalachian: among the mountains, five and a half miles west of Branchville, at an elevation of 950 feet.
- Quinton**, Salem County: Delaware Valley: three miles west of Alloway on the Alloway River. Good, cultivated, level land with little, deciduous wood.
- Raccoon Creek**, Gloucester County: Delaware Valley. Empties into the Delaware about eighteen miles below Camden. Swedesboro and Mullica Hill are on it.
- Rahway**, Union County: Piedmont Plain. Level or rolling country with much low brush and trees.
- Ramapo, N. Y.** Just over the border line and less than two miles from Suffern. The fauna of these places is identical with that just across the line in New Jersey.
- Ramapo Mts.**, Passaic County: Highlands. About three miles east of Ringwood, extending into New York, elevation about 1,100 feet. Slopes well wooded.
- Ramsey**, Bergen County: Highlands. About nine miles north of Paterson, on the line of the Erie Railroad. Hilly, somewhat rolling country, with considerable marsh land.
- Rancocas**, Burlington County: Delaware Valley. About five miles south of Beverly; marshy meadows along Rancocas Creek, rising abruptly to wooded upland: a well cultivated country.
- Red Bank**, Gloucester County: Delaware Valley. On the banks of the Delaware River about six miles south of Camden. Mr. Daecke cites this same locality as National Park.
- Red Bank**, Monmouth County: Delaware Valley. On the bank of the Shrewsbury River in a level fertile country, well farmed.
- Ridgewood**, Bergen County: Piedmont Plain close to Highlands: three miles northeast of Paterson. A hilly and rolling country with much woodland and rapid brooks in the rocky valleys and gullies.

- River Edge**, Bergen County: Piedmont Plain, at the edge of the Hackensack River, about three miles north of Hackensack. Hilly on each side, rising to 300 feet on the west; deciduous woodland.
- Riverside**, Burlington County: Delaware Valley. On Rancocas Creek, at its junction with the Delaware. Low ground along the creek, with the usual low meadows, scrub and woodland to the west and south.
- Riverside Drive**, New York City. Along the edge of the Hudson: sloping country similar to the Palisades in New Jersey.
- Riverton**, Burlington County: Delaware Valley. Nine miles southeast from Camden, on the Delaware. Diversified by swamp, low and high ground, with patches of hard wood interspersed with groves of pine.
- Rocky Hill**, Somerset County: Piedmont Plain. Rough, hilly land with deciduous woods.
- Roselle or Roselle Park**, Union County: Piedmont Plain. A few miles northwest of Elizabeth, in a rolling, partly wooded country, with deciduous trees and running brooks.
- Rutherford**, Passaic County: Piedmont Plain. On the Passaic River, just south of Passaic, at the foot of the ridge between the river and the Hackensack meadows.
- Salem**, Salem County: Delaware Valley. On Salem Creek, near the Delaware River. There is much mud and marsh along the creek, rising only slightly into an alluvial plain, on which is a little deciduous woodland.
- Sandy Hook**, Monmouth County: Delaware Valley island surrounded by coastal strip. A narrow tongue of sand separating the ocean from direct sweep into Raritan Bay. Was an excellent collecting ground some years ago, but now shut off by the U. S. Government, which has fortified it.
- Schooley's Mountain**: Highlands. At the western border of Morris County; a chain about twelve miles in length of peaks of from 1,000 to 1,200 feet: with much deciduous woodland and plenty of water.
- Schwartswood Lake** = Swartswood Lake: q. v.
- Sea Cliff**, Long Island: see Bellport.
- Sea Girt**, Monmouth County: Delaware Valley; about a mile south of Spring Lake. The usual level meadow back of the strictly shore formation.
- Sea Isle City**, Cape May County: Delaware Valley and coastal regions. On the coast, a sandy beach with the usual dunes supported by a central ridge referable to the Delaware Valley region, and backed by the usual salt marsh and mud flats of considerable extent.
- Seashore**: a general term that may mean any point between Sandy Hook and Cape May and may mean them all: in most instances, perhaps, Atlantic City and southward is intended.
- Seaville**, Cape May County: Delaware Valley. On the main land three and one-half miles north of Sea Isle City, at the junction of the pine barrens with the lowland merging into the salt marsh.

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- Seven Mile Beach**, Cape May County: Delaware Valley, Coastal Strip and Maritime. A long, narrow island fronting the ocean, between those on which Sea Isle City and Holly Beach are situated.
- Shark River**, Monmouth County: Delaware Valley. Forms a large lake, which opens into the ocean by a narrow inlet at Belmar, rising on each side to meadow and woodland.
- Shiloh**, Cumberland County: Delaware Valley. Four miles northwest of Bridgeton; level, light soil, with partly deciduous, though scrubby woodland.
- Short Hills**, Essex County: Highlands. Seven miles west of Newark, among low hills, with deciduous woodland and small stony brooks.
- Shrewsbury**, Monmouth County: Delaware Valley. Two miles south of Red Bank; low meadows and flat, deciduous and coniferous woodland.
- Somers Point**, Atlantic County, on Egg Harbor Bay: Delaware Valley on the edge of the Coastal strip. The usual maritime character, backed by scrub and pine land.
- Singac**, Passaic County: Piedmont Plain. About five miles southwest of Paterson: rather level, rolling country with much low growth and small wooded sections.
- Smithville**, Burlington County: Delaware Valley. Two miles east of Mt. Holly, on Rancocas Creek. Good cultivated land above the marshy meadows.
- Snake Hill**, Hudson County: Delaware Valley. A rather large wooded hill rising abruptly from the midst of the Hackensack meadows west of Hoboken. The base of this hill is a refuge for great numbers of swamp inhabitants that hibernate there, and many collectors from New York, Jersey City and Newark have filled their boxes and bottles in early spring from the material gathered beneath the stones and among the rubbish.
- South Amboy**, Middlesex County: Pine Barrens at edge of Delaware Valley. Marsh and scrub-land sandy, but with gravelly hills wooded with evergreen and deciduous, low, scrub-like trees and bushes. Offers quite diverse collecting grounds.
- So. Camden**: like Camden.
- Southern New Jersey**: same as South Jersey.
- South Jersey**. Means, usually the pine barrens and maritime region, embracing roughly the territory south of the West Jersey and Seashore Railroad.
- South River**, Middlesex County: Pine Barrens. Means the territory between Milltown and South River along the line of the trolley, and usually the swampy woodland.
- Sparta**, Sussex County: Highlands. On the Wallkill River, elevation about 650 feet, rising on all sides; four miles northeast from the head of Lake Hopatcong.
- Speedwell**, Burlington County: Pine Barrens. About fifteen miles southeast of Whitings and similar in character.
- Split Rock Lake**, Morris County: Highlands. Five miles northwest of Boonton.

- Spotswood**, Middlesex County: Pine Barrens. A little northeast of Jamesburg and much like it in general character, except that there is not so much woodland.
- Springdale**, Sussex County: Appalachian. About two and one-half miles n. w. of Andover. Hilly, with considerable marsh land in the s. w. portion.
- Springfield**, Union County: Highlands. One mile south of Millburn: slightly hilly, well cultivated, well watered country.
- Spring Lake**, Monmouth County: Delaware Valley. Belongs to the maritime district; diversified with swamp, lake, marsh and scrub land; some pine and deciduous trees.
- Stafford's Forge**, Ocean County: Pine Barrens. Three miles north of West Creek; large cranberry bogs at edge of pine barrens, close to coastal strip.
- Staten Island**, Richmond County, New York. Belongs geographically to New Jersey, forming the northern and western shores of Raritan Bay. The country is varied, mostly Delaware Valley formation, and the locality as cited gives no clue as to the character of the surroundings where the species was taken. A patch of pine barrens is at the southern end of the island.
- Stelton**, Middlesex County: Piedmont Plain. Level country, largely under cultivation, with low woodland and shrubby growth.
- Stone Harbor**, Cape May County: Coastal Strip. Seashore to marsh, with a low ridge of scrub.
- Suffern**, New York. Just across the State line on the Erie R. R. A hilly, stony country, with wooded slopes and rapid streams in the valleys. Some of the New York entomologists have collected here, their excursions not infrequently extending across the State boundary, where the fauna is exactly similar.
- Summit**, Union County: Highlands at edge of Piedmont Plain. Well up in the Orange Mountains, with deciduous woodland and plenty of small streams in the valleys and gullies.
- Swartswood Lake**, Sussex County: Appalachian. Four miles westerly from Newton. Elevation 480, rising from all sides in slopes covered with wood land and cut with rocky streams.
- Swedesboro**, Gloucester County: Delaware Valley. Well cultivated truck and fruit land, level or slightly rolling, with a little swamp to the northwest and a little deciduous woodland.
- Swinefield Bridge**, Morris County: Piedmont Plain. On the Passaic River at the edge of the Hatfield Swamp, about ten miles northwest from Newark.
- Taunton**, Burlington County: Pine Barrens, near the Delaware Valley region. Four miles southwest of Marlton.
- Tenafly**, Bergen County: Highlands. On the west slope of the Palisades about two miles north of Englewood.
- Three States Point**: Appalachian. At the end of a narrow spit of land extending into the Delaware just south of Port Jervis: practically the junction of N. Y., N. J. and Penna.

- Timber Creek**, empties into the Delaware about five miles south of Camden and forms part of the division between Camden and Gloucester Counties; mostly with low, marshy banks.
- Toms River**, Ocean County: Delaware River at edge of Pine Barrens. A short distance west from Barnegat Bay. Sand and scrub land with occasional taller wood land, marshy along the river course, locally swampy, some land in cranberries, increasing toward Island Heights. Ideal country for dragon flies and the mosquitoes that they feed upon.
- Trenton**, Mercer County: Delaware Valley. On the Delaware. Ranges from the muddy river bank to river marshes, which are of considerable extent, and to higher, level, cultivated upland.
- Tuckahoe**, Cape May County: Pine Barrens. On the Tuckahoe River at the point where the pine and scrub land begins to merge into salt marsh.
- Tuckerton**, Ocean County: Delaware Valley, between the Pine Barrens and the Coastal Strip. At the head of Tuckerton Creek, across which is Burlington County. A mixture of bog, swamp, pine barrens and salt marshes within a short distance.
- Vailsburg**, Essex County: Piedmont Plain. Between Newark and Irvington and like them in character.
- Van Cortland Park**, New York City.
- Verona**, Essex County: Piedmont Plain, close to Highlands. About one and one-half miles northwest of Montclair, on the first ridge of the Orange Mts., about 500 feet; quite some deciduous woodland.
- Vincetown**, Burlington County: Delaware Valley. About five miles southeast of Mt. Holly, at the head of the south branch of Rancocas Creek, with quite a large pond: good, level cultivated land.
- Vineland**, Cumberland County: Pine Barrens. A level, fairly well cultivated district, with surrounding rather tall scrub-land and pine groves. Hardly in but near to the pine barren type.
- Waretown**, Ocean County: Delaware Valley at the edge of Coastal Strip. About ten miles south of Toms River.
- Watchung Mts.**: see Orange Mts.
- Waverly**, Essex County, Piedmont Plain. A small place just south of Newark and bordering on a coastal strip of the Delaware Valley region.
- Weehawken**, Hudson County: Highlands. On the Hudson, at the base of the Palisades above Hoboken. Once an excellent and much frequented locality.
- Wenonah**, Gloucester County: Delaware Valley. Three miles south of Woodbury, and much like it in character.
- West Bergen**, Hudson County: Delaware Valley. Means the Newark Bay side of Bergen Point, q. v.
- West Berlin**, see Berlin.
- West Creek**, Ocean County: Delaware Valley between the Pine Barrens and the Coastal Strip. Three miles n. e. of Tuckerton and like it in character.

- West Creek Pond:** Delaware Valley. About three miles northeast of Tuckerton and very similar in character of surroundings.
- Westfield,** Union County: Piedmont Plain. On the line of the Central R. R., about two miles west of Cranford.
- West Hoboken,** Hudson County: Highlands on the border of Delaware Valley.
- Westville,** Gloucester County: Delaware Valley: between Gloucester and Woodbury. Diversified by swamp, low and high land, with patches of hard wood interspersed with groves of pine. Now known as Newbold.
- Westwood,** Bergen County: Piedmont Plain. About seven miles north of Hackensack, and more hilly.
- Weymouth,** Atlantic County: Pine Barrens. In a swampy district about seven miles south of DaCosta.
- White Horse,** Burlington County: Pine Barrens. About 3 miles west of Chatsworth: large natural meadow with pineland on all sides.
- Whitings,** Ocean County. Pine Barrens. Scrub-oak, sphagnum and cedar swamps.
- Wildwood:** see Five-Mile Beach.
- Williamstown,** Gloucester County: Pine Barrens. Pine and scrub land, with swamp and bogs along the creeks to the east and south.
- Woodbine,** Cape May County: Pine Barrens. Five miles southeast of Tuckahoe: scrub land, sandy barrens and swamps: withal a rich collecting ground.
- Woodbridge,** Middlesex County: Delaware Valley at the edge of the Piedmont Plain. About three miles north of Perth Amboy, almost at the edge of the clay and sand formations.
- Woodbury,** Camden County: Delaware Valley. Good, well cultivated land, with a little swamp and scattered patches of deciduous woodland.
- Woodland Cemetery,** Essex County: Piedmont Plain. A field of underbrush of willow, cherry, oak, beech and hickory: no trees. Within Newark city limits.
- Woodside,** Essex County: Piedmont Plain. On the south side of Second River at its junction with the Passaic: is practically the northeast section of Newark City.
- Woodstown,** Salem County: Delaware Valley. A light but good soil, the district well cultivated and only occasional patches of mixed deciduous and coniferous woodland.

Explanations of Abbreviations and Acknowledgments.

Aaron, Eugene M. Lepidopterist and student in the butterflies: cited from published records.

A. E. S. American Entomological Society: Philadelphia. This means that New Jersey specimens are in the society collection, usually with a State label only. The society now possesses, among others, the collections of the late Dr. George H. Horn and of the late Messrs. Wilt and Martindale. The collection of Mr. E. T. Cresson is also stored in its rooms, and there is much material from older sources, including quite a number of types. I have looked carefully over the collections in "Hymenoptera," and Dr. Calvert cites those in "Odonata."

Ang. Angleman, John B., Newark. Collects "Macro-lepidoptera," and has furnished some of the records credited to the Newark Society. Mr. Angleman's collections have been largely made within a few miles of Newark.

Angell, George W. J., New York City. Collector of "Coleoptera" chiefly, but occasionally cited in other orders.

Ashm. or Ash. Ashmead, Dr. William H., late of Washington, D. C. Dr. Ashmead was Assistant Curator of insects in the United States National Museum, and, until the time of his death, the leading authority in the "Hymenoptera." In the old catalogue that order was compiled by him from data furnished by collectors and contributors generally, from material in his own collection and from the collections in the U. S. Nat. Mus. He also made many determinations in "Hemiptera" for me.

Banks, Nathan, Falls Church, Virginia; Assistant in the Division of Entomology, U. S. Dept. of Agric. Is a specialist in the "Neuropterous" orders, and has determined not only my material, but that of other collectors who sent him their New Jersey specimens. I have used Mr. Banks' Catalog of Neuroptera as a guide in this list, but have given the divisions ordinal rather than family rank.

Beyer, G., New York City. Coleopterist; has sent me records chiefly from the northern section of the State.

Bf. Bischoff, E. A., Newark. An enthusiastic collector of "Coleoptera," and his records are numerous. His collecting grounds are chiefly the environs of Newark, but this embraces the marshy districts lying east and south, and the hilly country lying west and north along the first ridge of the Orange Mountains. The locality "Orange Mts.," in Mr. Bischoff's records, usually means the ridge west of South Orange, the vicinity of Hemlock Falls and in the direction of Eagle Rock.

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- Bird**, Henry, Rye, New York. A lepidopterist who makes a special study of boring larvæ and has added much to our knowledge of "Hydroecia" and allies, in which his records are cited.
- Bland**, James H., Philadelphia. One of our oldest coleopterists, and, in olden days, a great collector in southern New Jersey.
- Bno.** Bueno, J. R. de la Torre, New York City. Hemipterist, and specializes in the "Heteroptera." An earnest student of the younger generation, who has supplied the arrangement in his specialty and many of the records as well.
- Brn.** Boerner, Chas. R., Philadelphia. A coleopterist who has taken many good species in New Jersey. South Jersey is his stamping ground, and his material has been named by Mr. Wenzel, Mr. Liebeck, Prof. Fall and other authorities.*
- Brakeley**, J. Turner, Bordentown. An enthusiastic amateur and owner of the Lahaway Cranberry plantations, whence I have received a very large number of specimens from him. He is the originator of the plaster cast method of studying underground insects, and has added much to our knowledge of mosquito habits.
- Brb.** Barber, H. G., Roselle, N. J. Secretary of the New York Ent. Soc., and an Hemipterist who has furnished many records in that order. He has also looked over the manuscript of the "Heteroptera" and has made many useful suggestions.
- Br.** Brehme, H. H., Newark. Assistant in the mosquito work in the State, and has taken many of the species cited as from "Coll." Also collects and breeds "Lepidoptera," mainly butterflies, sphinges and larger bombyces. To Mr. Brehme I owe a very useful list of food plants and dates of the occurrence of the early stages as well as the number of broods noted.
- Bruner**, Lawrence, Lincoln, Nebraska; Professor at the State University: specialist in the "Orthoptera." Prof. Bruner has determined much of the material collected by me, and revised the manuscript of the previous list in the "Orthoptera."
- Bsk.** Busck, August, Washington, D. C. An assistant in the Entomological division of the U. S. Dept. of Agric., a student of the "Microlepidoptera" and a specialist in the "Tineid" families. His records are largely cited by Mr. Kearfott.
- Bt.** Beutenmuller, William, New York City. Associate Curator for "Lepidoptera" in the American Museum of Natural History. Mr. Beutenmuller has supplied records in several orders, and in "Coleoptera" and "Lepidoptera" has supplied many data concerning early stages, food habits, etc. In the "Cynipidæ" and "Cecidomyiidæ" he is authority for the present list. He has published several lists of species found near New York, and these have been freely used. His chief collecting ground in New Jersey has been the district near Fort Lee, along the foot of the Palisades, on their wooded slopes and often on their summit. Greenwood Lake and Lake Hopatcong have also been visited by him on entomological excursions.

* His collection is now at New Brunswick.

- Buckman**, Fred, Newark. Coleopterist and member of the Newark Society.
- Bwl.** Broadwell, Wm. H., Newark; Lepidopterist. Of late years has paid especial attention to the "Geometridæ," in which family most of his records appear.
- Bz.** Buchholz, Otto, Elizabeth. A lepidopterist and good collector whose material has been taken chiefly in Elizabeth and its environs.
- C.** Calvert, Dr. Philip P., Philadelphia. Professor in the University of Pennsylvania and specialist in the order "Odonata." Dr. Calvert has not only prepared the list in that order, but has furnished a large percentage of the records. Furthermore, he has determined most of the material taken in New Jersey by others, so that in this order the list is unusually complete and accurate.
- Carney**, John P. R., Camden. A collector in diurnal "Lepidoptera" who has sent me a list of his captures in Camden and Burlington Counties between 1867 and 1899.
- Castle**, Dr. D. M., Philadelphia. Coleopterist; has furnished a number of good records, many of them of species not found in recent years.
- C G.,** Greene, Charles T., Philadelphia. A general collector, especially interested in "Diptera," who has taken many good things in North as well as South Jersey.
- Ch.** Chittenden, F. H., Assistant in the Division of Entomology, U. S. Dept. Agric. A coleopterist, specially interested in life habits and development. Mr. Chittenden has collected at Orange and has a few records from other localities, but his most important contributions to the list are the notes on food habits chiefly in the "Phytophaga" and in those series containing species that attack stored products.
- Ckll.** Cockerell, T. D. A., Boulder, Colorado. Professor Cockerell has contributed notes on some of the bees sent him from New Jersey, and also on certain groups of scale insects.
- Clem.** Clemens, Brackenridge. A writer on "Micro-lepidoptera," cited from published records only.
- Coll.** This indicates that the record was taken from the Department collections at New Brunswick and the specimens may have been sent in by correspondents, bred or taken by Messrs. Dickerson, Grossbeck, Brehme or myself.
- Cr.** Crane, Marcus S., late of Caldwell. Mr. Crane was a general collector who had accumulated a large lot of material of all orders. He himself worked up some of his material in the better-known orders, but much of it was also submitted to specialists. Mr. Crane's records are of unusual value from the fact that in some orders no one else has collected in that general district.
- Cress.** Cresson, Ezra T., Philadelphia. Well known as an authority in "Hymenoptera." His collection, including many types, in the rooms of the American Entomological Society, contains many New Jersey specimens, usually with a State label only. These are credited to "Cress Coll." Mr. Cresson has published a catalogue of the "Hymenoptera," giving, among other things, the geographical distribution, and to this list reference is had when only "Cress" follows a record.

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Cnn. Cresson, George B., Philadelphia. Son of E. T. Cresson, and also interested in "Hymenoptera." All the records credited to him were made for the first edition, and his collecting was largely done in Camden and Gloucester Counties.

C. V. R., see Riley.

Davis, G. C., Pasadena, California. Mr. Davis is cited as authority for the New Jersey habitat of certain parasitic "Hymenoptera," and these records come from his published papers.

Dietz, Ottomar, late of New York City, a coleopterist whose collection contained some interesting species from North Jersey.

Dietz, Dr. William G., Hazelton, Penna. "Lepidoptera" and especially the "Tineoidea." Dr. Dietz prepared the list in this super-family in the previous edition, and is authority for many of the species listed. He has been good enough to determine much material sent him by New Jersey collectors, and also not a few "Tortricids" and "Pyralids." In the "Coleoptera" Dr. Dietz's papers in the "Rhynchophora" have been followed in the groups treated by him.

Div., Divers. This means that the record cited has been handed in by more than one, and usually more than two collectors.

Dke. Daecke, V. A. E., Harrisburg, Pa. An excellent general collector whose expeditions into South Jersey have produced a large number of most useful records in almost all orders. The determinations are almost invariably by specialists and reliable. In the "Tabanidæ" Mr. Daecke himself is authority and has furnished the data for this list.

Dkn. or **Dn.** Dickerson, Edgar L., Newark. Assistant in the N. J. Exper. Sta. Specializes in "Coleoptera," but collects generally. Many of the Chester records from the "Coll" are due to him.

Doll, Jacob, Brooklyn, N. Y. A collector and breeder of "Lepidoptera" who has few equals in the skill with which he prepares his specimens.

Dow, Robert P., Brooklyn. Collects generally, but chiefly in "Coleoptera." Has also specialized somewhat in "Thysanura" and is authority for the list in that order.

Ds. Davis, Wm. T., Staten Island. One of the few really good general collectors. He has made it an object to thoroughly explore the fauna of Staten Island, and his material, so far as he has not felt competent to work it up himself, has been identified by specialists; so the records may be considered entirely reliable. He has also collected at Lakewood, in Ocean County, Newfoundland, in Morris County, and, to a less extent, at Spring Lake, Passaic County, and other localities.

Dyar, Dr. Harrison G., Washington, D. C., in charge of the "Lepidoptera" in the U. S. National Museum. Dr. Dyar has made a specialty of classification based upon larval structures. He has supplied many notes of food plants of "Lepidoptera," and has also added much to the list of saw flies among the "Hymenoptera." In a few instances the facts with which his name are associated were obtained from his published papers, but as a rule they are original notes made for the previous edition of this work.

- Edw.** Edwards, Henry, late of New York City. Was a Lepidopterist of recognized authority, and published a list of the descriptions of early stages, from which some of the references to food plants are taken.
- Engelhardt,** George P., of the Children's Museum, Brooklyn. He is interested chiefly in "Lepidoptera," but gives some attention to other orders. His records are principally in the "Sesiidæ," to which family he has devoted much study.
- Fenninger,** Carl W., Philadelphia. A general collector who has taken some good things in South Jersey with Mr. Daecke, who gives his records.
- Fernald,** Dr. C. H., Amherst, Mass., Professor of Entomology at the Agricultural College. Is a special student in the "Tortricoidea" and "Pyralidoidea." He has kindly looked over and determined much of my material in the super-families mentioned, and has also determined many species for other collectors.
- Fitch,** Asa. For some years State Entomologist of New York; all records credited to him are from his published writings.
- Fox,** Dr. Harry, Ursinus College. Collected "Orthoptera" one year for Mr. Rehn, and cited as "H. Fox" in that order only.
- Fox,** William J., Philadelphia. Assistant Librarian in the Academy of Natural Sciences and special student in the aculeate "Hymenoptera." Mr. Fox has collected largely in Camden and Gloucester Counties, and his records add largely to the list. He has also determined much of the material collected by others, including myself, and this has made possible the incorporation of many records that would otherwise have been unavailable.
- Franck,** George, Brooklyn. Manager of the American Entomological Co., Lepidopterist; chiefly interested in the butterflies and larger moths.
- Fulda,** Dr. Carl, Brooklyn. Has collected in Staten Island, and his records are given by Mr. Davis.
- G G.** Greene, George M., Philadelphia. Collects generally and has added many useful records, especially in "Coleoptera," "Diptera" and "Hymenoptera."
- Gr.** Grossbeck, John A., New Brunswick. Assistant in the mosquito work in New Jersey.* Specialist in the lepidopterous super-family "Geometroidea," and authority for the arrangement of the list in that group. Has also written the list in the "Culicidæ" and "Cicadidæ," and has collected some of the material cited from the "Coll."
- H.** Hornig, H., Philadelphia. An amateur whose records in the "Odonata" are cited by Dr. Calvert.
- Hagen,** H. A. Late of Cambridge, Mass., and during his lifetime the leading authority in the "neuropterous" orders. Cited here from his published writings only.
- Haim.** Haimbach, Frank, Philadelphia. Collects in all orders, but especially in the "Lepidoptera" and particularly in the "Micros." Recently he has given much attention to the "Pyralidæ." His collections on shore points are especially valuable.

* Now of the Am. Mus. N. H., in N. Y. City.

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- Hardenberg**, C. B., Philadelphia. An amateur whose records in "Orthoptera" are cited by Mr. Rehn.
- Hayw.** Hayward, Roland. Entomologist to the Alabama Experiment Station. Cited from published records.
- Hebard**, Morgan, Philadelphia. An amateur whose records in "Orthoptera" are cited by Mr. Rehn.
- Heidemann**, Otto, Washington, D. C., collector and student in the "Hemiptera-Heteroptera" and especially "Capsidæ." Mr. Heidemann has named much of my material and has revised the list in the family "Capsidæ," adding considerably to the number of species and bringing the arrangement into accord with the present knowledge of the family.
- Henshaw or Hw.**, Samuel. Curator of the Agassiz Museum at Cambridge, Mass. Is a Coleopterist and especially interested in the literature of the order. His check-list forms the basis for the arrangement used in this work, and names of quite a number of species recorded from New Jersey were sent me by Mr. Henshaw.
- Herring**, Mrs. F. M., Plainfield. Collector of "Lepidoptera" and chiefly of butterflies.
- Hess**, J., late of Newark. A Coleopterist who furnished many records for the first edition.
- Hk.** Harbeck, H. S., Philadelphia. A general collector, but especially interested in the "Hymenoptera" and "Diptera," in which he has supplied many records. His collections at Trenton are especially important because so little work has been done there.
- Hn.** Hamilton, Dr. John, late of Pittsburg, Pa. Dr. Hamilton spent a short period in September for several years at Brigantine Beach, and his New Jersey collections were all made at that place and time. Dr. Hamilton was a thorough collector and a good student, his publications on "Coleoptera" and his faunal lists marking him as both reliable and accurate.
- Hnt.** See Huntington.
- Hopkins** (sometimes Hpks.), A. D. Assistant in the Division of Entomology, U. S. Dept. Agric. Makes a specialty of the "Scolytids," and has sent me many notes on food habits, etc. Much of my collection has been looked over by Dr. Hopkins, who has also made some suggestions as to the synonymy or general relation of species to each other.
- Horn**, Dr. George H., late of Philadelphia. Dr. Horn was the leading American Coleopterist at the time of his death, and determined a great many species for me in the more obscure families. His collections were always open to me, and practically all of my larger material has been directly compared with his specimens. Dr. Horn also named much of the material taken in New Jersey by the Philadelphia collectors, and in his material were a number of rare forms from our State. The collection is now in the possession of the American Entomological Society.
- Horv.** Horvath, Dr. G. Cited from published records.

- Hulst**, Dr. George D., late of Brooklyn, N. Y. Was a "Lepidopterist" and specialized in the "Geometridæ" and certain families of "Pyralidoidea." Dr. Hulst was my predecessor as Entomologist to the Experiment Station, and his collection is now in New Brunswick as the property of Rutgers College. Dr. Hulst determined a large portion of the "Geometrids" and some of the "Pyralids" for the last edition, and his papers in the groups revised by him are here followed.
- Huntington**, William S., Philadelphia. A collector of "Coleoptera" and "Lepidoptera," whose records were sent me by Mr. Johnson.
- Hw.** = Henshaw, which see.
- Jl. or Jtl.** Joutel, Louis H., New York City. Collects generally, but more particularly in "Coleoptera." Has sent me many useful records and notes on food habits, largely from the Fort Lee district and from Lakehurst.
- Jn.** Johnson, Charles W., Curator of the Boston Society of Natural History, Boston, Mass. Is a specialist in "Diptera," but collects also in other orders. He has furnished useful records in nearly all, and the list of "Diptera" has been almost entirely prepared by him. This list and its editor is much indebted to him, therefore, for material aid. Mr. Johnson has collected at several points in New Jersey, but mainly of late years at Delaware Water Gap, on the east side of the river, at Riverton, Burlington Co., and at other points readily accessible to Philadelphia.
- Jones**, F. M., Wilmington, Delaware. A Lepidopterist who has done some special work in New Jersey.
- Jul.** Jülich, William, late of New York City. Was a Coleopterist of many years' standing, especially interested in "Rhynchophora." In that series his notes were furnished for the first edition, and they have lost none of their value since. His collection is now with Mr. C. H. Roberts.
- Kf.** Kearfott, W. D., Montclair. Specialist in the "Microlepidoptera," who has written the list in several of these families. To his energetic and tireless labors the large additions to the list of species in these families is almost entirely due.
- Keller**, George J., Newark. Is interested in the "Macrolepidoptera," and his records are mostly of local collections.
- Klages**, E. A., Pittsburg, Pa. A Coleopterist who sent me a list of some interesting captures made in New Jersey.
- Kp.** Kemp, Stanley T., late of Elizabeth, formerly of Camden. Collects "Lepidoptera," but has also collected "Coleoptera" and supplied some good records. The determinations in the moths have been largely made by myself, and in the Micros many species have been submitted to Dr. C. H. Fernald and Dr. Wm. G. Dietz.
- Kr.** Kircher, George, Jersey City Heights. Lepidopterist. Most of his material has been collected near his home, and nearly all of it has been looked over or determined by me.

- Lansing**, Harmon, New Brunswick. An amateur, general collector who has taken some very good species at Lakewood.
- Lg.** Leng, Chas. W., Staten Island. Mr. Leng is a Coleopterist and a recognized authority in several families. He has added many species to the list from Staten Island and a few from Newfoundland, Lakehurst and other parts of the State. His collecting trips have been largely in company with Mr. Wm. T. Davis.
- Li.** Liebeck, Charles, Philadelphia. An excellent Coleopterist whose records in the list of beetles may be relied upon; he has also named material for several other collectors. As he has free access to the Horn collection for comparison and study, and is himself an indefatigable collector, his records are especially valuable. His collecting has been chiefly in Camden, Gloucester and Atlantic Counties.
- Li.** Linell, Martin L., late of the Department of Insects, U. S. National Museum. An excellent Coleopterist, who collected carefully throughout Hudson County, largely in the marshes, but also along the Palisades and a little in the Orange Mountains. His determinations were carefully made and may generally be relied upon.
- Loeffler**, Jacob, late of Newark. Coleopterist, from whom many records were obtained for the first edition.
- Long**, Bayard. Botanist, student in the University of Pennsylvania; collected "Orthoptera" for Mr. Rehn.
- Lt.** Laurent, Philip, Philadelphia. Collects generally, yet chiefly "Coleoptera" and "Lepidoptera," specializing in the latter. Mr. Laurent's records have been largely in the micros, where his material has been named by good authority. His collections have been mostly in Camden, Gloucester, Atlantic and Cape May Counties.
- Lv.** Love, Dr. E. G., New York City. Collects generally, but chiefly "Coleoptera," and in that order his records are especially useful, because of the dates. He has collected at a number of points in the State, but mostly along the Palisades, north and south from Fort Lee. His material has been generally determined by specialists, hence the records are to be relied upon.
- N.** Nell, Philip, Philadelphia. Collects generally, and his records are cited by several contributors.
- Neum.** Neumoegen, Berthold, late of New York City. Was a Lepidopterist who had accumulated during his lifetime one of the largest collections in the United States. This collection is now in the Museum of the Brooklyn Institute of Arts and Sciences.
- O. S.** Osten-Sacken, Baron R. von. One of the eminent early writers on American Diptera. Published records of his captures are cited by Mr. Johnson.
- Osborn**, Prof. Herbert, Ohio State Univ., Columbus, Ohio. "Hemiptera" and especially "Homoptera." Has furnished the information for the list in "Mallophaga" and has done much to bring the list in "Homoptera" to its present state of completeness.

- Osburn**, Raymond C., New York City. Professor in Columbia University. Dipterist, especially interested in "Syrphidæ," in which his records add important information.
- Pears**. Pearsall, R. F., Brooklyn. Lepidopterist, specializing in "Geometridæ," in which family most of his records will be found.
- Peck**, George W., late of Roselle. General collector, but his records largely confined to "Lepidoptera" and "Hemiptera."
- Pergande**, Theo. W., Washington, D. C. Assistant in the division of Entomology, U. S. Dept. Agric. Specializes in "Thysanoptera" and "Aphididæ," and has furnished much of the information in the lists of these series.
- Pm**. Palm, Charles, New York City. A collector of "Coleoptera" and "Lepidoptera" who has spent much time in the region about Lake Hopatcong, with which locality his name is most generally associated in this list.
- Pr**. Paulmier, Dr. Fred C., late of Madison, New Jersey. Collected "Coleoptera" and "Hemiptera," his records in this latter order being of especial value.
- Rehn**, James A. G., Academy of Natural Sciences, Philadelphia. Special student in "Orthoptera." Has collected largely in South Jersey, has named much of the material recently collected in the State and has prepared the mss. for the present list in his specialty.
- Reinick**, William R., Philadelphia, at one time much interested in "Coleoptera." Many of Mr. Reineck's records came to me from Mr. Johnson, but he has also sent me a very good list of "Staphylinidæ" from specimens determined for him by Mr. E. A. Schwarz.
- R**. Rhoads, Samuel N., Philadelphia. A Zoologist with a special interest for insects, particularly dragon flies. In 1899 he made a bicycle journey through South Jersey during the latter part of the season and captured a considerable lot of "Odonata," which Dr. Calvert determined.
- Riederer**, L. A collector of Dragon flies, whose records are cited by Dr. Calvert.
- Riley**, Dr. C. V., also **C. V. R.**, late of Washington, D. C. All records are from published data and mostly relate to early stages or food-plants.
- Rk**. Reinick, Wm. R.,-q. v.
- Rob**. Roberts, Chris. H., New York City. A Coleopterist who specializes in aquatic forms, and who has collected at various points in New Jersey. He has been good enough to work over, critically, the list of water beetles and has added greatly to the accuracy of the records in these families.
- Say**, Thomas. One of the fathers of American Entomology. All records credited to him are from his published writings.
- Sb**. Seib, Simon, late of Jersey City. Lepidopterist who has bred many species, making notes of dates and food plants. I have looked over his collection of moths and determined most of the smaller species. Mr. Seib's chief collecting grounds have been the environs of Jersey City Heights, Newark and the Oranges.

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- Schlecksor**, A., Irvington. A Coleopterist, member of the Newark Society, who has furnished a few records.
- Sf.** Schaeffer, C., Brooklyn. Assistant Curator of Insects in the Mus. of the Bkln. Inst. of Arts and Sciences and a good Coleopterist. Mr. Schaeffer has collected in New Jersey, chiefly about Snake Hill and along the Palisades, using the sweep net perhaps more than any other collecting apparatus. He has added many species to the list that are not elsewhere reported, and has given me much assistance in determining species and in arranging the synonymy in some families.
- Shoemaker**, Ernest, Brooklyn. Member of the Brooklyn Ent. Soc., who has sent in a few useful records.
- Sk.** Skinner, Dr. Henry, Philadelphia, Editor of Entomological News and Curator of the American Entomological Society. Is a Lepidopterist and confines his studies mainly to the "Papilionides" or butterflies. His recent catalogue of this super-family has been followed, and Dr. Skinner has added many dates and localities. South Jersey generally, but especially Cape May, is his collecting ground.
- Sleight**, Chas. E., Ramsey, Bergen Co. An amateur, collects in all orders; will yet furnish some excellent records from his section.
- Slosson**, Annie Trumbull, New York City. An enthusiastic student of humanity and insects, presenting the results of her studies as interestingly in the one case as in the other. Has collected only a little in New Jersey.
- Sm.** Smith, John B. My own collections have been made throughout the State and in all orders. Jamesburg, Anglesea and Lahaway have been more systematically explored than any other points, but many of the species recorded from Lahaway are really the results of the unselfish labors of Mr. J. Turner Brakeley. It may be added that in every order except the "Coleoptera" and "Lepidoptera" all the material collected by me has been submitted to specialists for determination. Most of the more recent captures are recorded as from the "Coll," and some of those specifically credited to me in the previous editions now appear under the more general head.
- Sp.** Schaupp, Frank G., late of Brooklyn, New York. A Coleopterist and specialist in the families "Cicindelidæ" and "Carabidæ," in which he published faunal lists. His main collecting grounds were along the base of the heights back of Hoboken and extending northwardly. Fort Lee, Clifton, Greenville and the banks of the Passaic were also explored, and his records in the families named are reliable.
- Ss.** Few-Seiss, C. Philadelphia. Specializes chiefly in "Hemiptera," in which he has added many records of importance. South Jersey and points easily accessible from Philadelphia have been chiefly collected over by Mr. Seiss.
- Stone**, Witmer, Philadelphia. Has collected a few species of "Odonata" and "Orthoptera" recorded by Dr. Calvert and Mr. Rehn.
- Stortz**, George, Newark. A Coleopterist whose collections have been made chiefly in the Newark district.
- Sz.** Schwarz, E. A., Washington, D. C. Assistant to the Entomologist in the U. S. Dept. Agric. and in charge of the "Coleoptera" in the U. S.

Nat. Mus. Mr. Schwarz is the best Coleopterist at present living in the United States. He has been good enough to look over the previous list and to note errors and probable errors. In this way it has been cleared of most of such species as were erroneously identified. Mr. Schwarz has determined many New Jersey specimens for others as well as myself, and, notably, all the "Staphylinids" credited to Mr. Reinick. He has done little collecting in New Jersey, yet is sole authority for the occurrence of several good species in our State.

Thompson, J., Staten Island, N. Y. Collects "Coleoptera"; his records cited by Mr. Davis or Mr. Leng.

U. Ulke, Henry, late of Washington, D. C. With Mr. E. A. Schwarz he compiled a list of "Coleoptera" in the District of Columbia, with notes on the food and other habits of the species, and these notes when used are credited to "U."

Uhler, Dr. Philip R., Baltimore, Md. Our leading authority in "Hemiptera-Heteroptera." The records cited are chiefly from his check list. Dr. Uhler has also determined much of the material cited by other contributors to this list. His credit is therefore greater than appears from the actual number of citations made.

U. M. = U. S. N. M.

U. S. Ag. United States Department of Agriculture, Division of Entomology. In this division an index is made of all the species complained of or sent in for information, and the locality from which the species was sent or complaint was made is connected with the species. Dr. L. O. Howard, Entomologist to the Department, was good enough to have this index looked over for records of species sent in from New Jersey, and quite a number of useful notes were obtained in this way.

U S N M. United States National Museum, Washington, D. C. This collection is now altogether the largest in the country, though exceeded by individual collections in almost every order. It contains much material from New Jersey from my old collection, which was sold to the Museum in 1887, from the Linell collection of "Coleoptera," and from the Fox collection of "Hymenoptera." There is also some material from other sources, and I have looked over all the orders other than "Coleoptera," "Lepidoptera" and "Diptera" for notes as to localities or other data.

Van D. Van Duzee, E. P., Buffalo, N. Y. Specialist in the "Hemiptera," and chiefly in the "Homoptera." Has determined much material for me and for other collectors, and has himself collected at several points in the State. Without his assistance the lists in the "Homopterous" families would be far less complete.

Vk. Viereck, Henry L., Division of Entomology, U. S. Dept. Agric., and previously of Philadelphia. Specializes in the "Aculeate Hymenoptera," and has collected extensively in New Jersey. Mr. Viereck has done for the present edition in "Hymenoptera" what Dr. Ashmead did in the last.

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- W.** Wenzel, Henry W., Philadelphia. One of the best collectors of "Coleoptera" in the country, and possesses the best individual collection in Philadelphia. His collections in New Jersey have been chiefly made along the line of the Atlantic City R. R., in Camden and Gloucester Counties, within easy reach of Philadelphia, and at Anglesea, Cape May County. This latter point has been a favorite, as the number of species taken there will testify. He has also collected at Lake Hopatcong and in the Orange Mts. To Mr. Wenzel the list of "Coleoptera" owes much of its completeness, and in the families "Scydmaenidæ" and "Pselaphidæ" he has practically prepared the entire list. Incidentally he also collects in other orders, the material gathered being generally turned over to his friends, according to their specialties.
- Watson**, Frank E., New York City. A Lepidopterist who gives much attention to the life histories of diurnals.
- W E B.** Britton, Dr. W. E., New Haven, Conn., Entomologist to the Experiment Station. Dr. Britton has been good enough to help me out in the "Aleyrodidæ" and "Coccidæ," the list in the first-named being as prepared by him.
- Weigand**, Fred, Philadelphia. An amateur whose captures are recorded by other collectors of that city.
- Wdt.** Weidt, A. J., Newark. A Lepidopterist and more recently interested in "Diptera." Most of his collecting has been done in the environs of Newark and in the Orange Mountains, and much of his material in the "Lepidoptera" has been seen by me.
- Wheeler**, Dr. William Morton, Harvard Univ., Professor of Entomology. Specializes in ants and has written the list in that series. Dr. Wheeler has made many of his studies in New Jersey, and this makes the records in the "Formicoidea" exceptionally complete and satisfactory.
- Wrms.** Wormsbacher, Henry, Jersey City. A Lepidopterist who has collected at various points in the Hackensack Valley. His records are scattered throughout the order.
- Zabriskie**, Rev. J. L. Has collected generally, largely at Flatbush, Long Island, and at Nyack and other points just north of the New Jersey line. Some of his specimens are in the U. S. Nat. Mus., and these are credited to him in this list.

A very few names have been omitted, where only cited once or twice, but I think no contributor of any important record has been overlooked: none has been intentionally left out, and sincere thanks are given to all for their contributions. It is only by the contributions of many, 135 in this case, that even an approximately complete survey of the insect fauna of any State can be obtained.

ILLUSTRATIONS.

The illustrations in this edition are nearly all identical with those used in the edition of 1900, and there acknowledged in detail. A very few have been omitted and substituted by better figures obtained from the United States Department of Agriculture, Division of Entomology. A very few have been drawn for this work by Mr. John A. Grossbeck, and these in general bear his initials.

SUMMARY.

Three editions of the list have been published. That of 1890 was a crude affair, hurriedly prepared from scanty data, yet decidedly useful. That of 1900 was carefully prepared, with the co-operation of all the collectors who had New Jersey material. It could fairly claim rank as a contribution to science, and the practical features made it of use to Agriculturists as well. It was the most ambitious undertaking of its kind, and its usefulness was far greater than anticipated. The edition has been long since exhausted and the continuing demand for copies is warrant for a new edition. The following table shows what progress has been made in our knowledge of the insects of the State:

Order.	Edition 1890.			Edition 1900.			Edition 1910.		
	<i>Fam.</i>	<i>Gen.</i>	<i>Species.</i>	<i>Fam.</i>	<i>Gen.</i>	<i>Species.</i>	<i>Fam.</i>	<i>Gen.</i>	<i>Species.</i>
Thysanura,	00,	00,	00.	00,	00,	00.	2,	18,	41.
Ephemera,	00,	00,	00.	1,	12,	25.	1,	13,	29.
Plecoptera,	00,	00,	00.	1,	11,	23.	1,	14,	25.
Mallophaga,	00,	00,	00.	2,	7,	23.	4,	14,	100.
Isoptera,	00,	00,	00.	1,	1,	1.	1,	1,	1.
Corrodentia,	00,	00,	00.	2,	11,	26.	1,	17,	39.
Platyptera,	00,	00,	00.	1,	3,	7.	1,	3,	9.
Neuroptera,	9,	61,	*174.	5,	16,	45.	6,	22,	41.
Mecoptera,	00,	00,	00.	1,	4,	10.	1,	4,	11.
Trichoptera,	00,	00,	00.	6,	25,	51.	7,	30,	56.
Odonata,	00,	00,	00.	3,	38,	90.	3,	43,	109.
Thysanoptera, ...	00,	00,	00.	1,	6,	12.	1,	6,	12.
Parasitica,	00,	00,	00.	1,	3,	7.	1,	3,	13.
Homoptera,	10,	101,	242.	11,	127,	399.	11,	149,	479.
Hemiptera,	26,	173,	313.	24,	200,	340.	23,	205,	504.
Dermoptera,	00,	00,	00.	1,	4,	5.	1,	5,	5.
Orthoptera,	7,	52,	117.	6,	58,	144.	6,	58,	154.
Coleoptera,	71,	815,	2,227.	71,	975,	2,845.	77,	1,079,	3,092.
Lepidoptera,	28,	484,	1,140.	53,	615,	1,570.	48,	715,	2,120.
Hymenoptera, ...	30,	302,	1,074.	84,	621,	1,718.	81,	541,	1,980.
Siphonoptera, ...	00,	00,	00.	1,	1,	3.	1,	4,	4.
Diptera,	57,	319,	811.	53,	443,	1,193.	53,	542,	1,661.
Totals,	238,	2,307,	6,098.	329,	3,181,	8,537.	331,	3,486,	10,385.

* Includes all from the Ephemera to the Odonata.

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Family names are printed in CAPITALS; synonyms are in *italics*. Where two pages are referred to, the generic name is duplicated in different orders.

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Clastoptera,	99	Collaria,	162	Coriscium,	573
Clausicella,	776	Collembola,	34	Coriscus,	149
Clemensia,	435	Colletes,	695	CORIXIDÆ,	168
Cleon,	38	COLLETIDÆ,	695	Corizus,	147
CLEONYMIDÆ,	646	Collops,	301	Corphyra,	370
Cleora,	503	Colobopterus,	63	Corrodentia,	51
CLERIDÆ,	302	Colon,	230	Corthylus,	400
Clerus,	302	Colopha,	115	Corticaria,	275
Cligenes,	144	Colpocephalum,	47	Corydalis,	56
Clinidium,	261	Colpognathus,	632	CORYLOPHIDÆ,	251
Clinocentrus,	613	COLYDIDÆ,	260	Corylophodes,	252
Clinocephalus,	180	Colydium,	261	Corymbites,	289
CLINOCORIDÆ,	159	Colymbetes,	222	Corynocoris,	145
<i>Clitellaria</i> ,	737	<i>Conchylis</i> ,	551	Corythuca,	148
Clivina,	201	<i>Conchylodes</i> ,	522	Coscinoptera,	340
<i>Clothilla</i> ,	52	Conicera,	762	Cosmia,	465
Clusia,	795	CONIOPTERYGIDÆ,	62	Cosmoconus,	622
Clytanthus,	329	Coniopteryx,	62	Cosmocepla,	136
<i>Clytochrysus</i> ,	681	Connophron,	231	Cosmopteryx,	565
Cnemidotus,	217	Conocephaloides,	187	COSSIDÆ,	515

Dendroleon,	63	Diastrophus,	602	DIXIDÆ,	710
Dendrophilus,	269	Diathrausta,	526	Docophorus,	44
Dendrotettix,	183	Diathræa,	531	Docosia,	724
Depressaria,	561	Dicælus,	207	Dolba,	429
Deptalia,	498	Dicerca,	292	Dolerus,	584
Deratopeus,	244	Dichæta,	805	Dolichoderus,	660
Dercetis,	483	Dichelonycha,	316	<i>Dolichopeza</i> ,	708
Dermestes,	266	Dichomeris,	559	DOLICHOPODIDÆ,	754
DERMESTIDÆ,	265	Dichromorpha,	180	Dolichopus,	756
DERODONTIDÆ,	277	Dichroocytus,	164	Dolopius,	287
Derodontus,	277	Dicranomyia,	705	Donacia,	337
Deromyia,	750	Dicranopselaphus,	280	Dorcaschema,	332
Deronectes,	219	Dicranoptycha,	706	Dorcatoma,	307
Derostenus,	641	Dictyophara,	94	Dorcus,	311
Derrima,	467	Dicymolomia,	531	Dorocordulia,	79
Desmia,	522	Dicyphus,	161	Doryctes,	613
<i>Desmlostoma</i> ,	606	Didea,	766	Dorymyrmex,	660
Desmocerus,	330	Didemops,	78	Doryodes,	471
Desmometopa,	812	Diedrocephala,	100	Doryopteryx,	52
Desmopachria,	218	Diglochis,	643	Dorytomus,	384
Desmoris,	384	Dilophonota,	428	Dræculacephala,	101
<i>Deva</i> ,	469	Dilophus,	734	Drapetes,	290
Dexia,	784	Dimorphopteryx,	583	Drasteria,	474
Dexiapsis,	793	Dineutes,	224	Drasterius,	286
DEXIDÆ,	784	<i>Dinocampus</i> ,	609	Drepana,	493
Diabrotica,	348	Dinocarsis,	645	DREPANIDÆ,	493
Diachorisia,	576	Dinoderus,	309	Drepanosiphum,	116
Diachus,	342	Dinopsis,	239	Dromæolus,	282
<i>Diastictis</i> ,	501	Diachus,	242	Dromius,	211
Dibolia,	354	Dioctria,	750	Dromogomphus,	77
Dibrachys,	642	Dicedes,	360	Drosophila,	810
Dicraneura,	107	<i>Dioleogaster</i> ,	610	DROSOPHILIDÆ,	809
Diacrisia,	439	Diommatus,	160	Drymus,	144
Dialectica,	572	Diomorus,	650	Dryobota,	450
Dialges,	622	DIOPSIDÆ,	805	Dryocampa,	433
Dialysis,	743	Dioryctria,	533	Dryocætes,	402
Dialytes,	314	Diplochila,	206	Dryomyza,	796
Dianthidium,	697	<i>Diplodus</i> ,	155	Dryope,	563
Diaphania,	522	Diplotaxis,	318	Dryophanta,	599
Diapheromera,	177	Dipterygia,	450	Dryophthorus,	399
Diaphnidia,	161	Discocerina,	806	Dryops,	278
Diaphorus,	754	Discoderus,	214	DUFUREIDÆ,	691
Dianous,	242	Disonycha,	350	Dynastes,	321
Diaperis,	361	Dissosteira,	182	Dynatosoma,	724
Diapria,	651	Distenia,	330	Dyschirius,	201
DIAPRIDÆ,	651	Distichona,	778	Dyscinetus,	320
Diaspis,	127	Ditemnus,	300	Dysmerus,	263
Diastata,	811	Ditoma,	260	Dysodia,	515
Diastictis,	501, 522	Dixa,	710	Dysphaga,	337

Dyspteris,	494	Elmis,	278	Ephialtes,	627
DYTISCIDÆ,	218	Elonus,	372	Ephistemus,	264
Dytiscus,	222	Elophila,	526	Ephuta,	665
E.		Emblethis,	144	Ephydra,	807
Eacles,	432	Emelinus,	372	EPHYDRIDÆ,	805
Earinus,	609	Emesa,	153	Epicærus,	378
Eburia,	326	Emmesa,	365	Epiaeschna,	77
<i>Eccritotarsus</i> ,	165	Emphor,	694	Epicallima,	562
Ecdytolopha,	546	EMPHORIDÆ,	694	Epicauta,	374
Echinomyia,	784	Emphytus,	582	Epicnaptera,	493
Echtrichodia,	155	EMPIDÆ,	757	Epicordulia,	78
Eclimus,	747	Empis,	759	Epicypta,	724
Ecpantheria,	439	Empoasca,	107	Epidiaspis,	128
Ecphylus,	614	Enallagma,	75	Epierus,	269
<i>Ectemnius</i> ,	681	Enarmonia,	543	Epiglæa,	466
Ectopiocerus,	161	<i>Enarmonia</i> ,	545	Epigrymyia,	777
Ectopria,	280	Enchenopa,	93	Epilachne,	254
Ectropis,	504	Encoptolophus,	181	Epimartyria,	578
Ecyrus,	334	Encyclops,	330	Epimecis,	504
Eczetesis,	623	ENCYRTIDÆ,	644	<i>Epinotia</i> ,	543
Eido,	552	Encyrtus,	644	Epipaschia,	532
Eiphosoma,	620	Endalus,	385	Epiphragma,	707
Elachiptera,	809	Endecatomus,	308	EPIPLEMIDÆ,	509
<i>Elachista</i> ,	565	Endelomyia,	584	Epipocus,	259
ELACHISTIDÆ,	563	ENDOMYCHIDÆ,	258	Epischnia,	534
Elachistus,	639	Endomychus,	259	<i>Episcopus</i> ,	160
Elaphidion,	326	Endrosis,	562	Episimus,	543
Elaphrus,	200	Enicmus,	275	Epistenia,	646
ELASMIDÆ,	641	Enicospilus,	620	Epithectis,	556
<i>Elasmocerus</i> ,	302	Ennearthron,	310	Epitragus,	358
Elasmopalpus,	534	Ennomos,	506	Epitrix,	352
Elasmosoma,	609	<i>Entechnia</i> ,	694	Epizeuxis,	481
Elasmostethus,	138	Entomobrya,	35	Epuræa,	272
Elasmucha,	138	Entomophthalmus,	282	Epyris,	667
Elasmus,	641	Entylia,	93	Erannis,	505
Elater,	285	Eois,	499	Erastria,	472, 498
ELATERIDÆ,	283	Eosphoropteryx,	469	Erax,	752
Elephantomyia,	705	Epagoge,	548	Erchomus,	246
Eleusis,	249	Epalpus,	784	Erebus,	480
Elidiptera,	95	Epelis,	500	Eremocoris,	145
Elipsocus,	53	Epeolus,	693	Eremomyia,	791
Elis,	666	<i>Epeolus</i> ,	692	Eremotylus,	620
<i>Ellema</i> ,	430	Epermenia,	566	Eretmocerus,	641
Elleschus,	388	Ephalus,	360	Eriocampa,	583
Ellida,	490	Ephemera,	37	Eriocera,	707
Ellipes,	191	Ephemerella,	38	Eriococcus,	123
Ellychnia,	297	EPHEMERIDÆ,	37	Eriocrania,	578
		Ephestia,	535	Erioptera,	706
		Ephestiodes,	535	Eristalis,	768

Eritettix,	179	Eueretagrotis,	452	Eusandalum,	645
Ernobius,	305	Eufdonia,	500	Euschistus,	135
<i>Eriocampa</i> ,	584	Eugnamptus,	378	Eusiphona,	812
Eros,	297	Eugnathodus,	106	Eusisyropa,	779
EROTYLIDÆ,	259	Eugnoriste,	725	Eusphyrus,	405
Erromenus,	623	Eugonobapta,	506	<i>Euspongius</i> ,	680
ERYCINIDÆ,	413	Euherrichia,	473	Eustalomyia,	791
Erycus,	384	<i>Euhybys</i> ,	759	Eusterinx,	616
Erythaspides,	591	Eulasiona,	776	Eustictus,	163
Erythemis,	82	Eulathrobium,	244	Eustilbus,	251
Erythrodiplax,	81	Eulecanium,	125	Eustixia,	525
Estigmene,	439	Eulechriops,	392	Eustroma,	496
Euæstethus,	243	Eulia,	550	Eustrophus,	366
Euancistrocerus,	670	Eulissus,	241	Eutelia,	471
Euantha,	785	EULOPHIDÆ,	638	Eutelus,	643
Euaesta,	803	Eumacrocentrus,	607	Eutettix,	104
Eubadizon,	608	Eumenes,	669	Euthera,	781
Eubaphe,	436	EUMENIDÆ,	669	Euthisanotia,	468
Eucalyptera,	471	Eumetopia,	800	<i>Euthoctha</i> ,	145
Eucerceris,	678	Eumeyrickia,	561	Euthyatira,	485
EUCERIDÆ,	693	Eumicrus,	232	Eutochia,	361
Euceros,	623	Eunotus,	646	Eutolyte,	451
Euchætiæ,	441	Eupactus,	306	Eutrapela,	507
Euchalcia,	469	Eupanychis,	467	Eutreta,	802
EUCHARIDÆ,	646	Euparyphus,	737	Eutylistus,	307
Euchlæna,	507	Eupelmus,	645	Eutyphlus,	233
Euchœca,	496	Euphoria,	321	Euura,	589
Eucinetus,	280	Euphorocera,	780	Euxesta,	800
Euclea,	511	Euphorus,	609	Euxoa,	455
Euclemensia,	562	Euphyto,	777	Euzophera,	535
Euclidia,	474	Eupithecia,	495	Evania,	637
EUCNEMIDÆ,	281	Eupitenus,	735	EVANIIDÆ,	636
Eucœla,	596	Euplectus,	233	Evarthrus,	205
Eucelidia,	596	Euplectrus,	639	Evergestis,	523
Euconnus,	231	Euplexia,	450	Evippe,	556
Eucosma,	540	Eupogonius,	334	Evoxystoma,	648
Eucrada,	305	Eupristocerus,	294	Evykleus,	687
Eucrostis,	499	Eupsalis,	396	<i>Exartema</i> ,	538
Eucymatoge,	496	Eupteryx,	107	Exechia,	724
Eudamus,	424	Euptoieta,	409	Exema,	340
Eudarcia,	576	Europs,	277	Exentera,	543
Eudecatoma,	647	Eurosta,	802	Exenterus,	624
Eudeilinea,	493	Eurynemus,	714	<i>Exephænes</i> ,	635
Eudemis,	544	Eurycyttarus,	510	Exetastes,	618
<i>Eudemis</i> ,	538	Eurygaster,	132	Exilis,	503
Euderces,	329	Eurypogon,	280	Exochilum,	620
Euderus,	641	Eurytoma,	647	Exochomus,	255
Eudocimus,	383	EURYTOMIDÆ,	647	Exochus,	621
Eudule,	495	Eurymycter,	405	Exoprosopa,	745

Exorista,	780	Gargaphia,	149	Gomphæschna,	78
Exoristoides,	779	Gastroidea,	346	Gomphus,	77
Exyra,	472	Gastrolobium,	243	Gonaspis,	602
Exyston,	623	Gastrophilus,	773	Gonia,	783
F.		Gastrops,	806	Goniognathus,	104
<i>Fabatana</i> ,	527	Gaurotos,	330	Goniocotes,	46
Fabiola,	562	Gelastocoris,	167	Goniomyia,	706
Fagitana,	462	Gelechia,	558	Gonodontis,	507
Falagria,	237	GELECHIDÆ,	554	Gonoides,	46
Falcaria,	493	Geocoris,	142	<i>Goniataulius</i> ,	68
Feltia,	454	Geodromicus,	249	Goniops,	739
Feniseca,	416	GEOMETRIDÆ,	494	Goniozus,	667
Fentonia,	489	GEOMYZIDÆ,	811	Gorytes,	679
<i>Fenusa</i> ,	591	Geopinus,	214	GORYTIDÆ,	679
Feralia,	450	Geotomus,	133	Gossyparia,	122
Fidia,	342	Geosargus,	737	Gracilaria,	571
<i>Figites</i> ,	596	Geotrupes,	315	Grammodes,	479
FIGITIDÆ,	596	Geranomyia,	704	Grammospila,	616
Fiorinia,	128	Geron,	747	<i>Gramptopsilopus</i> ,	754
Fitchia,	155	GERRIDÆ,	150	Graphisurus,	334
Fœnus,	636	Gerris,	151	Graphoderes,	223
Forcinolus,	278	Geshna,	526	Graphomyia,	788
Forficula,	171	Gibbium,	305	Graphops,	343
FORFICULIDÆ,	171	Glaea,	466	Grapta,	410
Formica,	662	Glaphyria,	521	Grotea,	629
FORMICIDÆ,	655	Glauce,	555	GRYLLIDÆ,	190
Fornax,	282	Glena,	504	Gryllotalpa,	191
Frontina,	780	Glenurus,	62	Gryllus,	192
Fucellia,	793	Gloma,	759	Grypeta,	238
FULGORIDÆ,	94	Glossonotus,	91	Gueneria,	500
Fulvius,	162	Gluphisia,	490	Gymnandrosana,	546
G.		Glyphidocera,	559	Gymnetron,	389
Gaberasa,	483	Glyphipteryx,	553	Gymnochæta,	779
Gædiopsis,	783	Glyphonyx,	287	Gymnoclytia,	774
Galactomyia,	775	Glypta,	625	Gymnonychus,	588
Galasa,	528	Glyptina,	354	Gymnophora,	762
Galerita,	209	Glyptobaris,	394	Gymnopternus,	757
Galerucella,	347	Glyptoma,	249	Gymnoscelus,	607
Galesus,	651	<i>Glyptomorpha</i> ,	615	Gymnosoma,	774
Galgula,	472	Glyptoscelis,	342	Gynandropus,	214
<i>Galgulidæ</i> ,	167	Gnathias,	692	Gypona,	101
<i>Galgulus</i> ,	167	Gnathocerus,	360	Gypsochroa,	497
Galleria,	532	Gnathodon,	696	Gypsonoma,	543
Ganonema,	69	<i>Gnathodus</i> ,	106	GYRINIDÆ,	223
Garganus,	161	Gnathotrichus,	401	Gyrinus,	223
		Gnophomyia,	707	Gyrophypnus,	241
		Gnorimoschema,	557	Gyrophæna,	237
		Gnorimus,	322	GYROPIDÆ,	48
		Goes,	332	Gyropus,	48

H.			
<i>Habritus</i> ,	646	Heliomata,	500
<i>Habrobracon</i> ,	615	Heliothis,	467
<i>Hadena</i> ,	449	Heliothrips,	84
<i>Hadrobregmus</i> ,	306	Heliozela,	566
<i>Hadrodactylus</i> ,	624	Heliria,	91
<i>Hadrodrema</i> ,	164	Heluomorpha,	212
<i>Hadronotus</i> ,	653	Helobia,	707
<i>Hadrophlebia</i> ,	38	Helochara,	101
<i>Hæmatobia</i> ,	788	Helochares,	226
<i>Hæmatopinus</i> ,	86	Helocombus,	227
<i>Hæmatopota</i> ,	740	Helocordulia,	79
<i>Hæmatopsis</i> ,	498	Helodes,	280
<i>Hæmonia</i> ,	338	Helomyza,	795
<i>Hagenius</i> ,	76	HELOMYZIDÆ,	795
<i>Halesus</i> ,	68	Helophilus,	769
HALICTIDÆ,	686	Helophorus,	224
Halictoides,	691	Helops,	362
Halictus,	687	HELORIDÆ,	652
HALIPLIDÆ,	217	Helorus,	652
Haliplus,	217	Helotropha,	451
Halisidota,	441	Hemadas,	646
Hallomenus,	366	Hemantus,	371
Haltica,	352	Hemaris,	425
Halticoptera,	646	HEMEROBIIDÆ,	60
Halticus,	161	Hemerobius,	61
Hammomyia,	791	Hemerocampa,	490
Hapithus,	193	Hemerodromia,	758
Haplandrus,	358	Hemichroa,	588
Haploa,	438	Hemicrepidius,	289
Haptoncus,	272	Hemileuca,	434
Harmonia,	254	HEMILEUCIDÆ,	434
Harmostes,	147	Hemimene,	546
<i>Harpactopus</i> ,	677	Hemirhipus,	284
Harpalus,	214	Hemistenus,	243
<i>Harpiphorus</i> ,	583	Hemitaxonus,	582
Harrisimemna,	446	Hemiteles,	631
Harrisina,	514	Hemyda,	777
Harpyia,	489	HEPALIDÆ,	578
<i>Hebrus</i> ,	150, 152	Heptagenia,	38
Hecabolus,	613	Heræus,	143
Hecalus,	103	Hercostomus,	757
Hedychridium,	668	Herculia,	527
Hedychrum,	668	Heriades,	697
Heidemannia,	160	Hermetia,	736
Helcon,	607	<i>Herpestomus</i> ,	632
Helicobia,	786	HESPERIDÆ,	420
Helicopsyche,	69	Hesperobium,	243
<i>Helicoptera</i> ,	95	Hesperodes,	725
		Hesperotettix,	183
		Hetærina,	74
		Heterius,	269
		Heterachthes,	327
		Heterocampa,	488
		HETEROCERIDÆ,	279
		Heterocerus,	279
		Heterogamus,	613
		Heterogenea,	513
		Heterogramma,	483
		Heteromyia,	712
		Heteroneura,	795
		HETERONEURIDÆ,	794
		Heteropelma,	619
		Heterophaga,	604
		Heteroplectron,	69
		Heterophleps,	495
		Heterothops,	239
		Heteroxys,	644
		Hetæmis,	332
		Hexagenia,	37
		Hexarthrum,	399
		<i>Heza</i> ,	156
		Hilara,	759
		Hilarella,	782
		Hillia,	448
		Himatium,	399
		Himella,	460
		Hippelates,	808
		Hippiscus,	181
		HIPPOBOSCIDÆ,	813
		Hippodamia,	253
		Hippopsis,	335
		Hister,	268
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		Holcaspis,	600
		Holcocephala,	750
		Holcocera,	563
		<i>Holcopelte</i> ,	641
		<i>Holcostethus</i> ,	134
		Hololepta,	268
		Holonomada,	692
		Holopogon,	750
		Holostrophus,	366
		Homalium,	249
		Homalomyia,	789
		Homalotylus,	644
		Homaspis,	624
		Homochlodes,	502
		Homæmus,	132

Homœosoma,	535	Hydrophoria,	791	Hyppa,	450
Homoglæa,	466	Hydrophorus,	756	Hypopygia,	527
Homohadena,	451	Hydroporus,	219	Hyposoropha,	474
Homolota,	237	Hydropsyche,	71	Hyptis,	637
Homophoberia,	478	HYDROPSYCHIDÆ,	70	Hypulus,	365
Homophysa,	521	Hydrotæa,	789	Hysterosia,	552
Homoporus,	642	Hydrous,	225		
Homoptera,	479	Hydrovatus,	218		
Homopyralis,	474	Hyetodesia,	790		
Homosteia,	576	<i>Hygrolitis</i> ,	610	I.	
Honora,	535	<i>Hygrotrechus</i> ,	151	Ibalia,	604
Hoplandria,	238	Hylastes,	404	IBALIIDÆ,	604
Hoplia,	316	Hylemyia,	791	Ichnea,	303
Hoplismenus,	636	Hylesinus,	404	Ichneûmon,	632
<i>Hoplisus</i> ,	679	Hylobius,	383	ICHNEUMONIDÆ,	616
Hoplocampa,	588	Hylotoma,	525	Ichneutes,	607
Hoplogaster,	792	Hylotrupes,	392	Ictericæ,	802
Horcias,	165	Hylurgops,	404	Idana,	799
Horismenus,	641	Hymenarcys,	135	Idiocerus,	102
Horistonotus,	285	Hymenia,	522	<i>Idiolispa</i> ,	630
Hormaphis,	114	Hymenorus,	363	Idiostethus,	395
Hormisa,	482	Hypargyricus,	590	Illice,	435
Hormiscus,	405	Hyparpax,	489	Ilnacora,	161
Hormorus,	378	Hypena,	484	Ilybiosoma,	221
Hulstia,	535	HYPENIDÆ,	480	Ilybius,	220
Hyadina,	806	Hypenula,	483	Ilythea,	806
Hyaliodes,	161	Hyperæschra,	487	Incurvaria,	574
Hyalomyodes,	777	Hyperaspis,	256	Inga,	561
Hyalopteris,	116	Hyperchiria,	432	<i>Ingura</i> ,	470
Hyamia,	474	<i>Hyperechia</i> ,	751	Iodia,	464
Hybos,	759	Hyperetes,	52	Ipiaulax,	615
Hybroma,	576	Hyperitis,	506	Ipimorpha,	466
Hydaticus,	222	Hyperplatys,	334	Ips,	274
Hydnocera,	303	Hyphantria,	439	Ischalia,	373
Hydræna,	225	Hypnoidus,	285	Ischnaspis,	130
Hydrellia,	806	Hypocala,	478	Ischnodemus,	142
Hydria,	496	Hypocera,	761	Ischnomyia,	811
Hydriomena,	497	Hypochæta,	776	Ischnoptera,	174
Hydrobius,	227	Hypocælus,	282	Ischnorhynchus,	141
<i>Hydrocampa</i> ,	522, 525	<i>Hypocrabro</i> ,	681	Ischnura,	76
Hydrocanthus,	218	Hypoderma,	773	Ischyryus,	260
<i>Hydrocharis</i> ,	226	Hypolampsis,	349	Isia,	440
Hydrochus,	225	Hypophlæus,	362	Isochaetes,	512
Hydrecia,	462	<i>Hypomicrogaster</i> ,	610	Isocorypha,	575
Hydrometra,	152	Hypoprepia,	435	Isocratus,	642
Hydromyza,	794	Hypopteromalus,	643	Isocybus,	652
HYDROPHILIDÆ,	224	Hypostena,	776	<i>Isodontia</i> ,	677
<i>Hydrophilus</i> ,	225	<i>Hypotaxonus</i> ,	583	<i>Isodromas</i> ,	631
Hydrophilus,	226	<i>Hypothenemus</i> ,	401	Isodyctium,	590
				Isogenus,	40

Isogona,	474	Languria,	259	Leptobyrsa,	148
<i>Isopteryx</i> ,	40	Lanthape,	532	Leptocella,	70
Isosoma,	648	Laodamia,	534	LEPTOCERIDÆ,	70
Isomira,	363	Lapara,	430	Leptocerus,	70
Isoperla,	40	Laphria,	752	Leptochilus,	671
Isoplastus,	230	Laphygma,	451	Leptogaster,	749
Isotoma,	35	Laphystia,	750	Leptoglossus,	146
<i>Itamoplex</i> ,	630	Lappus,	371	Leptolinus,	242
Ithycerus,	380	Largus,	140	Leptomeris,	499
		Laricobius,	304	Leptomorphus,	724
		Larra,	683	Leptopeza,	759
		LARRIDÆ,	683	Leptophlebia,	37
		LASIOCAMPIDÆ,	492	Leptopygas,	617
Jalysus,	148	Lasioderma,	306	Leptorhaptus,	651
Janassa,	488	Lasioglossum,	687	Leptostyla,	149
Janus,	594	Lasiopogon,	750	Leptostylus,	333
JASSIDÆ,	103	Lasiops,	790	<i>Leptoterna</i> ,	163
Jassus,	106	Lasiopoda,	726	Leptothorax,	659
Johannseniella,	712	Lasius,	661	Leptotrachelus,	209
Junonia,	411	Laspeyresia,	545	Leptoypa,	149
		Latreillimyia,	779	Leptura,	331
		Lathrobiella,	244	Lepturges,	334
		Lathrobioma,	244	Lepyronia,	98
		Lathrobium,	243	Leria,	795
		<i>Lathrobium</i> ,	244	Leskia,	777
		Lathropus,	263	Leskiomima,	777
		Lathrotaxis,	244	Lestes,	74
		LATRIDIIDÆ,	274	Lesteva,	249
		Latridius,	275	Lethocerus,	168
		Lauxania,	798	Leucania,	458
		<i>Laverna</i> ,	566	Leuce,	555
Labena,	629	Lebia,	210	Leucodesmia,	639
Labia,	171	Lechriops,	392	Leucophthalmia,	498
Labidomera,	344	<i>Leiphron</i> ,	607	<i>Leucophthalmia</i> ,	498
Laccobius,	226	Lema,	338	Leucopsis,	813
Laccophilus,	218	Lepidocyrtus,	35	Leucorhinia,	81
Lachnocrepis,	213	Lepidophora,	747	Leucospis,	649
Lachnosterna,	318	Lepidosaphis,	129	Leucostola,	755
Lachnus,	115	Lepidostoma,	69	Leucostoma,	777
Lacosoma,	509	Lepinotus,	52	Leuctra,	41
LACOSOMIDÆ,	509	Lepipolys,	451	Liancalus,	756
Læmophilæus,	263	Lepisma,	33	Libellula,	80
Læmosaccus,	389	Leptacinodes,	242	LIBELLULIDÆ,	78
Lætilia,	535	LEPTIDÆ,	742	Liburnia,	97
Lagium,	585	<i>Leptina</i> ,	447	Libythea,	413
LAGRIDIIDÆ,	364	LEPTINIDÆ,	228	LIBYTHEIDÆ,	413
Lamenia,	97	Leptinus,	228	Ligyrocoris,	143
Lampria,	751	Leptinotarsa,	345	Ligyrrus,	320
Lampronota,	629	Leptis,	743	Limacodes,	512
LAMPYRIDÆ,	296				

LIMACODIDÆ,	511	Litholomia,	461	Lycogaster,	667
Limenitis,	412	LITHOSIIDÆ,	434	Lycomorpha,	434
Limnebius,	226	Livia,	108	Lyda,	581
LIMNEPHILIDÆ,	68	Lixus,	383	LYDIDÆ,	581
Limnephilus,	68	Loberus,	264	LYGÆIDÆ,	140
Limnerium,	619	<i>Lobioptera</i> ,	813	Lygocerus,	654
Limnichus,	278	Lobophora,	495	Lygranthæcia,	468
Limnobaris,	395	Lobopoda,	363	Lygus,	140
Limnobia,	705	LOCUSTIDÆ,	185	Lygus,	164
Limnophila,	707	Loderus,	584	LYMEXYLIDÆ,	309
Limnophora,	790	Lomamyia,	60	Lymexylon,	310
Limnoporos,	151	Lomanaltes,	484	Lymnæcia,	565
<i>Limnotrechus</i> ,	151	Lomatopleura,	162	Lyonetia,	573
Limoniis,	288	<i>Lomechusa</i> ,	238	Lyperosia,	788
Limosina,	796	Lonchæa,	797	Lyroda,	684
Limothrips,	84	Lonchoptera,	761	<i>Lysiphlebus</i> ,	605
Limulodes,	250	LONCHOPTERIDÆ,	761	Lysitermus,	614
<i>Lina</i> ,	346	Longistigma,	116	Lytrosis,	503
<i>Lindenius</i> ,	682	Longitarsus,	354		
Linnæmyia,	779	Longurio,	709		
Linolathra,	244	Lopheros,	297		
<i>Lioderma</i> ,	134	<i>Lophoderus</i> ,	550	Macaria,	501
Liodes,	230	Lophodonta,	487	Machilis,	34
Liogma,	708	Lophopteryx,	487	Macquartia,	776
<i>Liolyda</i> ,	581	Lophyrus,	581	Macratrìa,	371
Liopus,	333	Lopidea,	161	Macremphytus,	583
LIOTHEIDÆ,	47	Lopus,	160	Macrobasis,	374
<i>Liotropis</i> ,	136	Loxandrus,	206	Macrocentrus,	606
LIPARIDÆ,	490	Loxaulus,	599	Macrocera,	724
Lipeurus,	45	<i>Lorocephalus</i> ,	609	<i>Macrocoleus</i> ,	160
Lipochæta,	807	Loxocera,	804	Macroductylus,	317
Lipocosma,	522	Loxostege,	523	Macroductium,	615
<i>Lipolexis</i> ,	605	Loxotropa,	651	Macromeigenia,	779
Lipura,	36	LUCANIDÆ,	311	Macromia,	78
Lispa,	793	Lucanus,	311	Macronema,	70
Lispinus,	249	Lucidota,	297	Macronoctua,	450
<i>Lispocephala</i> ,	793	Lucilia,	786	Macronychus,	279
<i>Lissonota</i> ,	629	Ludius,	286	Macrophyta,	586
Lissorhoptrus,	385	Luperaltica,	354	MACROPIDÆ,	691
Listotrophus,	239	Luperina,	449	Macropis,	691
Listronotus,	382	Luperodes,	349	Macrops,	383
Litanomyia,	758	Luteva,	153	<i>Macrorileya</i> ,	647
Litargus,	265	Lycæna,	416	Macrosargus,	737
Lithacodes,	513	LYCÆNIDÆ,	414	Macrorelia,	653
Lithacodia,	472	Lycia,	504	Macrorelus,	302
<i>Lithocelletis</i> ,	568	Lycoperdina,	258	Macroxyela,	580
Lithocharis,	245	Lycostomus,	296	<i>Macrurocampa</i> ,	489
Lithochrus,	251	Lyctocoris,	158	Madarellus,	394
Litholathra,	244	Lyctus,	309	Magdalis,	386

Magusa,	451	<i>Megischus</i> ,	604	Merisus,	642
MALACHIDÆ,	301	Melalopha,	486	Merium,	325
<i>Malacocoris</i> ,	160	Melanactes,	290	Mermira,	179
Malacomyza,	62	<i>Melanathus</i> ,	133	Merocorinæ,	145
Malacosoma,	492	Melandrya,	365	Meromyza,	808
Mallophora,	752	MELANDRYIDÆ,	364	Meronera,	237
Mallota,	769	<i>Melanobracon</i> ,	615	Merope,	66
Malporus,	371	<i>Melanocoryphus</i> ,	140	Meroptera,	534
Malthinus,	300	Melanolophia,	504	Mesamia,	103
Malthodes,	300	Melanolestes,	154	Mesites,	399
Mamestra,	456	Melanomma,	474	<i>Mesitus</i> ,	667
MANTIDÆ,	175	Melanophila,	292	Mesochorus,	618
Mantispa,	60	Melanophora,	784	Mesocrina,	616
MANTISPIDÆ,	60	Melanophthalma,	275	Mesogramma,	767
Mantura,	353	Melanoplus,	183	Mesoleius,	622
<i>Maracanda</i> ,	63	Melanorhopala,	149	Mesoleptus,	624
Marasmalus,	471	<i>Melanostelis</i> ,	695	Mesoleuca,	497
Margaronia,	522	Melanostoma,	766	Mesolomia,	464
<i>Margaronia</i> ,	522	Melanotus,	287	Mesopocus,	53
Marmara,	573	<i>Melanoxanthus</i> ,	116	Mesorhaga,	754
Martyringa,	560	Melasis,	281	Mesostenus,	630
Marumba,	430	Melasoma,	346	<i>Mesotherus</i> ,	82
Masicera,	781	Melba,	233	Mesovelia,	152
Mastogenius,	294	Meligethes,	273	Metabletus,	211
Matus,	221	<i>Melinna</i> ,	161	Metachæta,	782
Mayetiola,	729	Melipotis,	475	Metachroma,	343
Mea,	576	Melissodes,	693	Metacelus,	621
Mecopeltus,	393	Melitæa,	409	Metacosmus,	747
Mecoptera,	65	Melitara,	534	Metagea,	646
Mecostethus,	181	Melitta,	690	Metallus,	591
Mecyna,	523	Melittia,	516	Metanema,	507
<i>Mecyna</i> ,	523	Melitoma,	694	Metapelma,	645
Mecynotarsus,	372	Melittobia,	640	Metathorasa,	473
Medeterus,	756	MELLINIDÆ,	680	Meteorus,	608
Megachile,	695	Mellinus,	680	Methoca,	663
MEGACHILIDÆ,	695	Mellisopus,	546	Methypostena,	777
<i>Megacælum</i> ,	163	<i>Meloborus</i> ,	619	Metriocnemus,	714
Megalocoleus,	160	Meloe,	374	Metopia,	782
Megalodacne,	259	MELOIDÆ,	373	<i>Metopon</i> ,	643
Megalopyge,	514	Melophagus,	814	Metoponia,	473
MEGALOPYGIDÆ,	513	MEMBRACIDÆ,	90	Metrobates,	151
Megamelanus,	97	Memythrus,	517	Metrocampa,	505
Megamelus,	97	Menecles,	136	Metzneria,	554
Megapenthes,	286	Menesta,	559	Mezira,	139
Megarhyssa,	627	Meniscus,	627	Mezium,	305
Megarthus,	249	Menopon,	47	Miarus,	389
Megastigmus,	650	Meracantha,	362	Micracis,	403
Megastilicus,	245	<i>Meraporus</i> ,	643	<i>Micrarge</i> ,	592
Megilla,	253	Merinus,	358	Microbembex,	679

Microcentrum,	187	Monocrepidius,	285	Myopa,	772
Microcentrus,	94	Monoctenus,	588	Myopsocnemia,	52
Microchrysa,	737	Monohammus,	332	Myopsocus,	53
Microcœlia,	447	Monoleuca,	512	Myospila,	788
Microclytus,	329	Monomorium,	656	Myrmecina,	656
Microdon,	763	Monophadnoides,	591	MYRMELEONIDÆ,	62
Microdus,	609	Monophadnus,	590	Myrmica,	658
Microgaster,	610	Monopis,	574	Myrmosa,	665
Microlathra,	244	Monosoma,	583	MYRMOSIDÆ,	665
<i>Micromelus</i> ,	642	Monotoma,	277	Mystacides,	70
Micromus,	61	MONOTOMIDÆ,	277	Myzina,	666
Micropeplus,	249	Monoxia,	348	MYZINIDÆ,	666
MICROPEZIDÆ,	803	Mononychus,	392	Myzus,	118
Microphthalma,	783	MORDELLIDÆ,	368		
Microplitis,	610	Mordella,	369		
MICROPTERYGIDÆ,	578	Mordellistena,	369		
Microrhopala,	354	Morellia,	787	N.	
Microrrhagus,	282	Mormidea,	135	NABIDÆ,	149
Microscapha,	366	Morrisonia,	457	Nacerdes,	367
Microtonus,	367, 608	Mosillus,	809	Nacophora,	504
Microvelia,	150	Murgantia,	136	Nadata,	487
Milesia,	771	Musca,	787	NÆOGEIDÆ,	152
Milichiella,	813	MUSCIDÆ,	786	Næogeus,	152
Milyas,	155	Muscina,	788	Nannia,	495
Mineola,	533	Mutilla,	664	Nannothemis,	81
Mineus,	137	MUTILLIDÆ,	664	Nanops,	388
Miogryllus,	192	Myas,	204	Napomyza,	811
Miotropis,	639	Mycetæa,	258	Narvesus,	154
Mirax,	612	Mycetina,	258	Naso,	96
MIRIDÆ,	159	Mycetochara,	363	Natada,	512
Miris,	163	MYCETOPHAGIDÆ,	264	NAUCORIDÆ,	167
MISCOGASTERIDÆ,	646	Mycetophagus,	264	Nausibus,	262
Miscophus,	684	Mycetophila,	724	Neaspilota,	802
Misogada,	488	MYCETOPHILIDÆ,	722	Nebria,	200
Mixogaster,	763	Mycetoporus,	247	Necrobia,	304
Molanna,	70	Mycotretus,	260	Necrophorus,	229
Molophilus,	706	Mycterus,	367	Nectarophora,	118
Molorchus,	327	Mydæa,	790	Nehalennia,	75
Moma,	447	MYDAIDÆ,	749	Neides,	148
Mompha,	566	Mydas,	749	Nematoproctus,	755
Monachus,	342	Myiocephalus,	609	Nematus,	590
<i>Monachus</i> ,	164	Myiolepta,	765	Nemobius,	191
Monalocoris,	165	Myiophasia,	775	Nemognatha,	374
Monarthrum,	401	Myllæna,	238	Nemopoda,	804
<i>Monecphora</i> ,	98	MYMARIDÆ,	637	Nemoria,	499
<i>Monedula</i> ,	679	Myndus,	96	Nemosoma,	276
Monellia,	116	Myocera,	784	Nemotelus,	738
Monobia,	669	Myodites,	376	Nemoura,	41
Monoblastus,	623	Myodocha,	143	Neoscasia,	768
				<i>Neoborus</i> ,	164

Neocatalaccus,	643	Nola,	435	Ocyptera,	779
Neoclytus,	329	NOLA,	436	Ocypus,	240
Neocelidia,	106	NOLIDÆ,	435	Odontæus,	315
Neoempheria,	723	Nomada,	692	Odontobracon,	614
Neoglaphyoptera, ..	724	NOMADIDÆ,	691	Odontomerus,	625
Neoharmonia,	254	Nomiaephagus,	665	Odontomyia,	737
Neomastix,	388	Nomius,	202	Odontonyx,	280
Neomysia,	254	Nomophila,	523	Odontophyes,	580
Neonympha,	412	Nomotettix,	178	Odontosia,	48
Neoperla,	40	Nonagria,	461	Odynerus,	669, 670
Neopus,	585	Nortonia,	669	<i>Ebahus</i> ,	135
Neoscleroderma, . . .	668	NOSODENDRIDÆ,	278	Ecanthus,	192
Neotettix,	178	Nosodendron,	278	Ecetina,	70
Neotiglossa,	135	Nothosympycnus, ..	755	<i>Ecetina</i> ,	69
Neotypus,	632	Nothus,	367	Ecicius,	159
Nepa,	157	Notiophilus,	200	Oecleus,	96
Nephanes,	250	Notiphila,	805	Ecophora,	562
Nephelodes,	458	Notodonta,	487	ECOPHORIDÆ,	560
Nephopteryx,	534	NOTODONTIDÆ,	485	Oedalea,	759
Nephrocerus,	762	Notoglossa,	682	Edancala,	143
NEPIDÆ,	157	Notogonia,	683	Edaspis,	801
<i>Nepticula</i> ,	567	Notonecta,	169	EDEMERIDÆ,	367
Nepyta,	502	NOTONECTIDÆ,	169	Edionychis,	350
Nerice,	487	Notopygus,	624	Oeme,	326
NERTHRIDÆ,	167	Nototrachys,	620	Oence,	576
Neurigona,	755	Notoxus,	372	Oestodes,	289
Neurocolpus,	163	Notozus,	668	ESTRIDÆ,	773
Neurocordulia,	79	Nudobius,	241	Estrophasia,	777
Neuroctena,	796	NYCTEOLIDÆ,	436	Estrus,	774
Neuroctenus,	140	Nyctobates,	358	Ogdoconta,	470
Neuronnia,	68	Nyctobia,	494	Olene,	490
Neuroptynx,	63	Nyländeria,	661	Olethreutes,	539
Neuroterus,	598	NymphalidÆ,	408	Olfersia,	814
Neurotoma,	581	Nymphula,	525	Oliarus,	95
Nezara,	136	Nysius,	141	Olibrus,	251
Nicagus,	311	Nysson,	680	Oligia,	448
Nicentrus,	395	NYSSONIDÆ,	680	Oligolochus,	395
Niocoles,	751			Oligomerus,	305
Nigetia,	436			Oligosthenus,	650
Nirmus,	44	O.		Olisthopus,	209
Nisaxis,	235	Obera,	336	Olophrum,	249
Nisoniades,	423	Obrium,	327	Omalus,	668
NITELIDÆ,	684	Ocellataria,	52	Omethes,	299
Nitidula,	272	OCHTERIDÆ,	166	Ommatius,	752
NITIDULIDÆ,	271	Ochtera,	806	Ommatostola,	461
Nitzschia,	47	Ochterus,	166	Onophron,	198
Noctua,	453	Ochthiphila,	813	Omosita,	273
NOCTUIDÆ,	443	Octotemnus,	310	Omphalocera,	527
Nodonota,	344	Ocyptamus,	765	Oncerosmetopus,	162

Papilio,	419	Pegomyia,	792	Perithous,	627
PAPILIONIDÆ,	419	Pelastoneurus,	757	Peritrechus,	144
Papirius,	35	PELECINIDÆ,	654	Perla,	40
Parabolocratus,	103	Pelecinus,	654	Perlesta,	40
Paracalocoris,	163	Pelococera,	767	PERLIDÆ,	39
Paraclemensia,	575	Pelocoris,	167	Peronea,	547
Paradidyma,	782	Pelecotoma,	376	Perothops,	282
Paragus,	764	Pelenomus,	393	<i>Peristenus</i> ,	609
Paralechia,	556	Peleteria,	783	Petalium,	306
Paralimna,	806	Pelina,	806	Petrophora,	497
Paralipsa,	532	Pelidnota,	320	Pezomachus,	631
Parallelia,	478	<i>Peliopelta</i> ,	142	Phæcasiophora,	510
Parallelomma,	794	<i>Pelagonus</i> ,	166	Phædon,	346
Paramesius,	651	Pemphigus,	114	Phænonotum,	228
<i>Paramesus</i> ,	103	Pemphredon,	675	Phæocyma,	479
Parandra,	323	PEMPHREDONIDÆ,	675	Phæogenes,	632
Paranomus,	289	Pentagonica,	212	PHALACRIDÆ,	251
<i>Paranothyreus</i> ,	682	Pentagramma,	98	Phalacrus,	251
Paraphia,	502	Pentaria,	369	Phalænostola,	474
Paraplagia,	778	<i>Pentatoma</i> ,	134	Phaleria,	361
Paraprosena,	784	PENTATOMIDÆ,	132	Phalonia,	551
Paraselandria,	583	Penthe,	364	Phanæus,	313
Parasierola,	667	Penthelispa,	261	Phanerotoma,	612
<i>Parasiobla</i> ,	583	Penthima,	101	Phanurus,	654
Parastichtis,	465	Penthoptera,	708	Pharmacis,	552
Parataxonus,	582	Peoria,	536	Phasgonophora,	649
Paratenetus,	361	Pepsis,	673	Phasioclista,	775
Paratenodera,	177	Percnoptilota,	497	Phasiops,	784
Paratettix,	178	Perdita,	691	PHASMIDÆ,	177
Paratiphia,	666	Peribalus,	134	Pheidole,	658
Paraxenetus,	165	Periclista,	591	Phellopsis,	358
Parectopa,	572	Periclistus,	597	Phenacoccus,	123
Parharmonia,	518	Pericompsus,	204	Phengodes,	298
Parlatoria,	130	Peridroma,	454	Phenolia,	273
PARNIDÆ,	278	Perigaster,	393	Pheosia,	487
Paromalus,	270	Perigæa,	448	Phigalia,	505
Paroxya,	185	Perigenes,	143	Philænus,	99
Parydra,	807	Perigona,	209	<i>Philampclus</i> ,	426
Pasimachus,	200	PERILAMPIDÆ,	647	PHILANTHIDÆ,	677
Passalæcus,	676	Perilampus,	647	Philanthus,	678
Passalus,	311	Perilitus,	608	Philenome,	573
Patrobis,	204	Perilloides,	137	Philhydrus,	227
Paururus,	593	<i>Perillus</i> ,	137	<i>Philhydrus</i> ,	226
Pediæcus,	262	Periplaneta,	175	Philobia,	591
Pedicella,	737	Peripsocus,	53	Philometra,	482
Pedicia,	708	Perisemus,	667	Philonthus,	240
PEDICULIDÆ,	85	Perispasta,	524	Philonyx,	598
Pediculus,	85	Perissopterus,	640	Philopotamus,	71
Pediopsis,	102	Perithemis,	82	<i>Philopsia</i> ,	495

PHILOPTERIDÆ,	43	Phyllonoryter,	568	Pityobius,	288
Philosamia,	431	Phylloscelis,	95	Pityophthorus,	401
Philothermus,	261	Phylloscirtus,	193	Plagia,	778
Phiprosopus,	472	Phyllotreta,	354	<i>Plagiodera</i> ,	346
Phlegethontius,	428	Phyllotrox,	384	Plagiognathus,	160
Phlegyas,	142	Phylloxera,	113	Plagiomimicus,	468
Phlepsius,	105	Phylocentropus,	71	Plagionotus,	328
Phlæophagus,	399	Phymaphora,	258	Plagiotoma,	801
Phlæosinus,	404	Phymata,	157	<i>Plagiotrypes</i> ,	636
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Index to Popular Names.

Few insects have popular names that are definitely applicable to one species only. The same insect may be known under different names in different parts of the State, and the same name is often applied to quite different insects. Quite usually the food plant is associated with a general term, as wheat louse, melon louse, apple louse, etc., etc. Any references to popular terms of this character must necessarily be somewhat indefinite, because there are half a dozen species of plant lice on apple, two or three dozen species of galls on oak and so on. Throughout this list I have given the popular names in general use in this State, and the index gives also a number of the crop headings with the chief pests infesting them.

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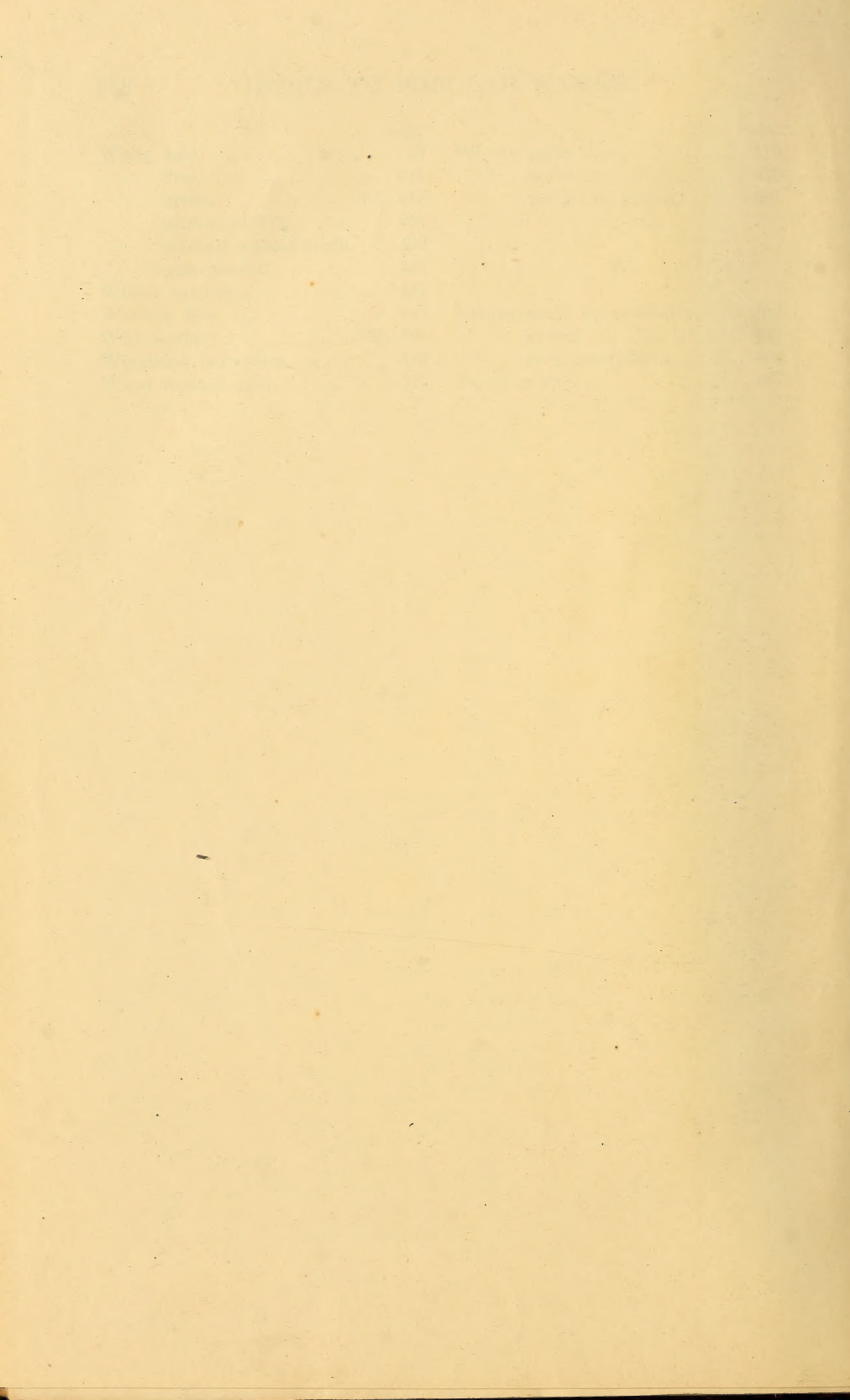
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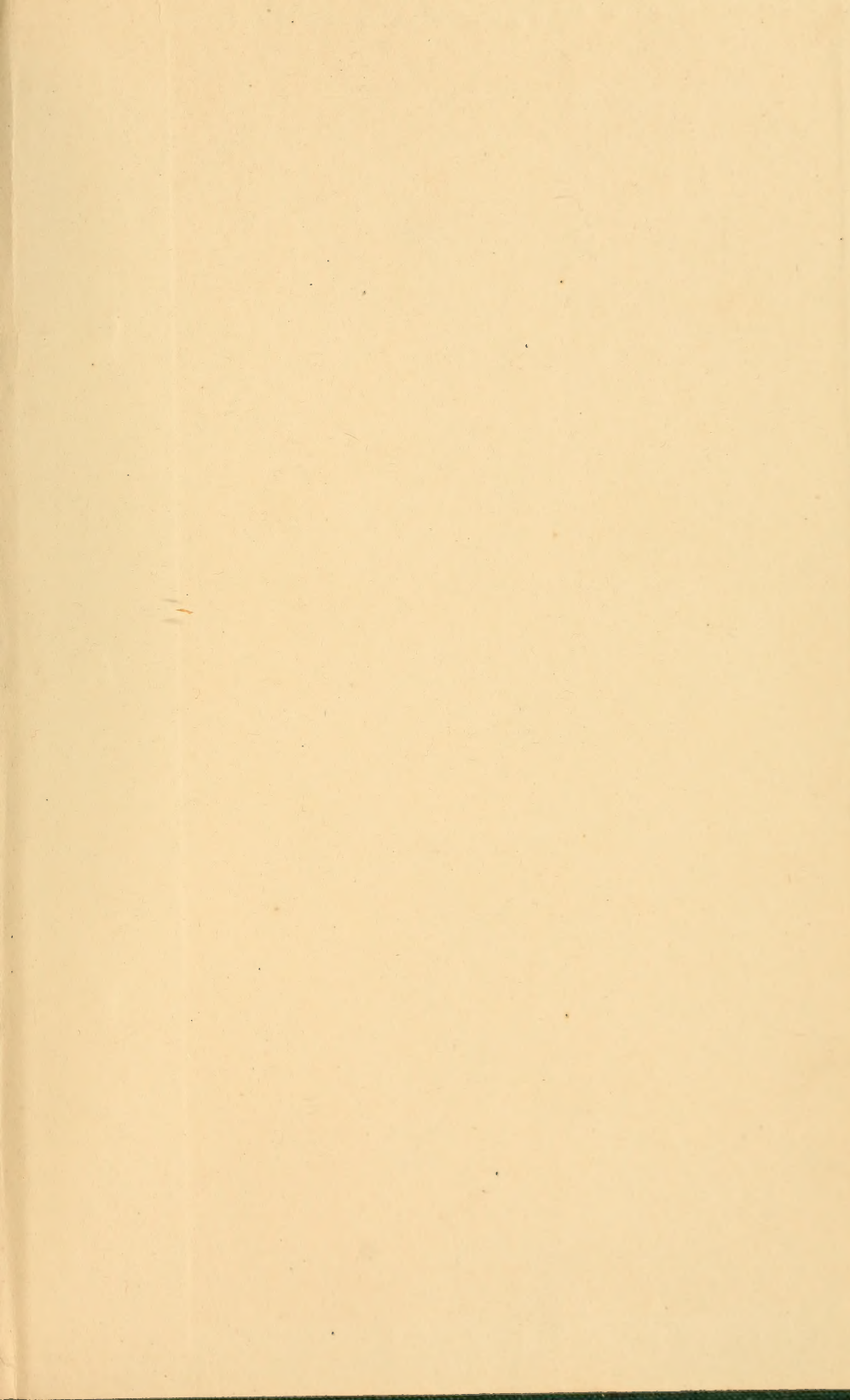
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